AN INVESTIGATION INTO THE BACKGROUNDS OF SENIOR HIGH SCHOOL STUDENTS TO DISCOVER ~~WHAT~~ FACTORS IN THE BACKGROUNDS OF ~~WHICH~~ GIRLS WHO ELECT MATHEMATICS ARE ASSOCIATED.

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Thesis

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CHAPTER I

BACKGROUND RESEARCH OF THIS THESIS

Available studies concerning sex differences and background influences or associations in the election of high school subjects, particularly mathematics, are limited in number. However, related studies exist on general sex differences, trends in the election of mathematics, reasons for course changes, and general background influences. The aspects of these studies pertinent to this thesis follow.

General Sex Differences

Psychologists seem agreed that there are differences in the abilities and interests of boys and girls.

> Though there is no real difference in mental ability between the sexes, there is far greater variability in ability among males than females. The few brightest and few dullest pupils will usually be boys. The girls are more closely grouped about the norm.[1]

Daniel Starch also maintains the existence of sex differences. "But so far as the native abilities involved in school work are concerned, boys and girls might as well pursue

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1 William H. Burton, Nature and Direction of Learning, (New York, London: D. Appleton and Company, 1929), p.134-5.

the same courses from the first day of school to the last".[2]

J. E. Wallace Wallin in a test survey on spelling efficiency concluded:

> The results would seem to lend experimental verification to the oft repeated dictum, that while girls surpass boys in memory work, the boys excel the girls in work requiring judgment, reasoning, reflection. This is particularly true, so far as these results indicate, for the older boys.[3]

Edward L. Thorndike points out the following differences in the sexes as evident from babyhood.

> Thus the original satisfyingness of manipulation of things, of 'experimentation' with them--that is, doing something to things and having them do something as a result is relatively stronger in boy--than in girl babies, whereas the original satisfyingness of gregariousness, attentiveness to human faces and voices, being approved and affectionately treated and the like, is relatively stronger in girl--than in boy babies.
>
> This difference between the sexes seems to play a large part in determining even so remote and artificial a matter as the choices of high school and college electives, boys showing relatively stronger interest in the physical sciences and girls in literature and psychology.[4]

Paul A. Witty and Harvey C. Lehman found that "...girls participate more frequently than boys in play activities involving indirect responses, use of language, etc.",[5] and Daniel Starch points out that females are superior to males in linguistic ability, but (as mentioned above) not so much so,

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2 Daniel Starch, Educational Psychology, (New York: The Macmillan Company, 1929), p.63.

3 J. E. Wallace Wallin, "Spelling Efficiency in Relation to Age, Grade, and Sex, and the Question of Transfer," The National Elementary Principal, 19: 125, March 1940.

4 Edward L. Thorndike, Educational Psychology, (New York: Teachers College, Columbia University, 1913), 1, 299.

5 Harvey C. Lehman, and Paul A. Witty, "Psychology of Play Activities", Journal of Applied Psychology, 22:618, November, 1938.

as to cause any real difference in their accomplishments in different subjects.[6]

That girls like to read more than boys do was also shown in an investigation by Paul A. Witty and Harvey C. Lehman.[7]

J. W. Ai, in a study of sex differences in school achievement found that

> ...achievement tests given to elementary school pupils in Chungking showed no sex differences in Chinese and arithmetic computation, a difference in arithmetic reasoning of doubtful significance, and a difference in favor of the boys in general knowledge, social studies, and nature study.[8]

Sex differences in the life problems and interests of high school students were found by Percival M. Symonds to be as follows:

> Boys rank money higher than girls as a problem and they rank personal attractiveness and etiquette lower as problems.
>
> Boys indicate greater interest than girls in safety, health, money, civic affairs, recreation, and study; and less interest than girls in personal attractiveness, etiquette, and getting along with other people.[9]

V. C. Smith made a study of sex differences in general science. He came to the following conclusions:

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6 Daniel Starch, Educational Psychology, (New York: The Macmillan Company; 1929), p.76

7 Harvey C. Lehman, and Paul A. Witty, "Some Suggestive Results Regarding Sex Differences in Attitude Toward School Work," Journal of Applied Psychology, 24:454, September 1940.

8 J. W. Ai, "Sex Differences in School Achievement", Chinese Journal of Educational Psychology, English Abstract, 1945, 1, No.4, 9-13, cited in Psychological Abstracts, 1946, p.1729.

9 Percival M. Symonds, "Sex Differences in the Life Problems and Interests of Adolescents", School and Society, 43:752, May 30, 1936.

Typical questions on which girls excel are: Artificial silk made from wood pulp is called rayon; iodine mixed with starch gives a dark blue color; a dish 1/3 red and 2/3 yellow appears to be orange when rotated rapidly.

Boys are superior to girls in answering these: Lamp cords are insulated with cloth and rubber; a dry cell is contained in a zinc can; an airplane with two sets of wings is a biplane.

Material generally covered in biology shows no sex differences in general, but the subdivisions show slight differences.

Physiography material shows no sex differences.

Chemistry material shows significant differences in favor of boys.

Physics material is much easier for boys than for girls, the median differences on subtopics ranging from 4--22%.[10]

L. G. Osborn found similar results in the relative difficulty of high school subjects.

Five subjects stood out as unquestionably harder for girls than for boys, namely: physics, plane geometry, chemistry, first year bookkeeping, first year algebra. Five subjects were harder for boys than girls: second year English, second year Latin, first year English, fourth year English, first year shorthand. The only subject in which there was no difference was economics.

The girls rated all subjects involving mathematics with the exception of solid geometry and advanced algebra as more difficult than did the boys. All sciences were rated more difficult by the girls than by the boys, as were also the social sciences, except sociology. The boys, on the other hand, invariably marked subjects involving languages, both English and foreign, as more difficult than did the girls.[11]

In studying sex differences in mathematics specifically,

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10 V. C. Smith, "Sex Differences in the Study of General Science", Science, 75:56, January 8, 1932.

11 "L. G. Osborn, "Relative Difficulty of High School Subjects," School Review, 47:99. February, 1939

Harl R. Douglas said:

> In general, then it must be concluded that, in spite of the fact that girls made higher average marks in school and furnish a lower percentage of failures in mathematics, boys make better scores on mathematics tests than do girls of the same grade.[12]

B. S. Bramwell, in a study of college students over a period of forty years found that men do better in mathematics and women do better in history and languages. "In the case of Mathematics, the differences in favour of the male are too striking to be explained entirely by nurture." [13]

These same general sex differences were also found in the occupational interests of high school students as measured by the Strong Vocational Interest Blank.

> All but one of the occupational interest scales which show higher scores for boys are in the 'science' group. The girls appear to have more interest in those occupations which involve the use of language, and more interest in work which brings them into contact with many people.
>
> Small differences are found on the scales for psychologist, mathematician, architect, real estate salesman, personnel manager, vacuum cleaner salesman, and office clerk.
>
> The interests of the girls are apparently not limited to those occupations traditionally open to women.[14]

> The results of the present investigation may be considered as confirming Carter and Strong's conclusion regarding the existence of certain differences between the measured

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12Harl R. Douglas ,"Sex Differences in Secondary School Mathematics, "The Mathematics Teacher,30:22, January, 1937.

13 B. S. Bramwell, "A Note on the Intellectual Differences of the Sexes", Eugenics Review, 33:48, July, 1941.

14 Harold D. Carter, and E. K. Strong Jr. "Sex Differences in Occupational Interests of High School Students", Personnel Journal, 12:174, October, 1933.

vocational interests of boys and girls of high school age.[15]

After a study of women mathematicians, A. E. Andrews concluded:

> ...there is no evidence to indicate that, if women are given the same motivation and opportunity as men, women are not equally capable in the field of mathematics.[16]

Trends in the Election of Mathematics

Over a period of sixty years (1883--1943), Raymond D. Bennett found a moderate but continuous downward trend in the total amount of mathematics taken in high school. The average number of units completed decreased from 2.79 to 1.97.[17] Seventy percent of the records investigated in this study were women.[18]

There are very few women mathematicians in this country. In a study of women mathematicians, A. E. Andrews found that of the 28,000 names listed in American Men of Science in 1938, only 2,000 were women, and of these only 142 were women mathematicians.[19]

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15 F. H. Finch and M. E. Odoroff, "Sex Difference in Vocational Interests", Journal of Educational Psychology, 30:156, February, 1939.

16 A. E. Andrews, "A Statistical Study of Women Mathematicians in the Six Editions of American Men of Science," Journal of Educational Sociology, 17:550, May, 1944.

17 Raymond D. Bennett, "Trends in the Amount of Mathematics and Science Taken in High School" School Review, 52:408, September, 1944.

18 Ibid, p. 406.

19 Andrews, op. cit. p. 545.

In 1943, the magazine Mademoiselle wrote:

> According to the National Roster of Scientific Specialized Personnel, there are only 916 women in this country who are mathematicians of full professional standing. And there are fewer than 5000 women mathematics majors now in our colleges.[20]

Because this article did not give the number of males no comparisons can be made.

Reasons for Course Changes.

Many high school students change their original choice of course (or major sequence) at the end of the ninth year. Ruth Maynard, found that 73% of the students she studied gave the following as their reasons for changing to another course:

1 My friend (or friends) signed up for this course or sequence.
2 My sister (or brother) followed this sequence in school.
3 My mother (or father) insisted that I take this sequence.[21].

Of 651 college women asked, 40.5 per cent named some phase of mathematics,36.07 per cent, Latin, and 29.00 per cent, History as the subject they had lost interest in in high school. The six most mentioned reasons for loss of interest were:

1 Failure to see need for the subject (29%)
2 Uninteresting material (24%)
3 Monotonous methods (23%)
4 Inability of teacher to "put it across" (23%)
5 Lack of foundation (22%)
6 Difficulty of material (20%) [22]

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20 Mademoiselle, July, 1943, p. 50.
21 Ruth C. Maynard, "Cutting Changes of Sequence", Clearing House, 21:295, January, 1947.
22 Florence M. Young, "Causes for Loss of Interest in High School Subjects as Reported by 651 College Students" Journal of Educational Research, 25:114, February, 1932.

General Background Influences

Margaret Rhoads Ladd made a study of the relation between reading ability and certain background factors.

> Through the classroom methods of group testing now available, no marked relationships have been found between reading ability and gross scores on socio-economic status of the home, play interests, and general personality adjustment respectively. [23]

Paul L. Boynton and Ruth Dowell Woolwine found a definite relationship between the economic status of high school girls and their vocational aims.

> The highest [24] girls, though, for whatever reason one may wish to assign, seem to be more occupationally imaginative, or less likely to feel restricted in their vocational choices.[25].

Summary

None of the studies cited covered the same field as this thesis, but they did furnish some suggestive sources of influence in students' backgrounds. Some agreement is expressed in

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23 Margaret Rhoads Ladd, "The Relation of Social, Economic, and Personal Characteristics to Reading Ability", Contributions to Education, Number 582, Teachers College, Columbia University, p.83.

24 Highest Economic Bracket.

25 Paul L. Boynton, and Ruth Dowell Woolwine, "The Relationship Between the Economic Status of High School Girls and Their Vocational Wishes and Expectations," Journal of Applied Psychology, 26:414, August, 1942.

the sex differences in interest and ability in certain subjects. Girls were shown to be generally interested in and to do better in language pursuits and boys in mathematics and science. However, there is disagreement as to whether this ability and interest is inborn.

One investigator concluded that boys excel in reasoning, and another that this conclusion was doubtful. Other sex differences suggested by writers were; girls excel in memory work; girls are interested in social attributes; and boys are interested in money and study.

No difference was found by one investigator in the vocational interests of boys and girls in the field of mathematics. This same study found that girls' vocational interests were not limited to traditionally female occupations.

There are only a small number of women mathematicians in the United States, but it was expressed that there is no evidence to indicate that women are not as capable as men in this field.

A downward trend was found in the study of mathematics, and other research suggested possible reasons for this in the difficulty and uninterestingness of the material, the poor foundation of the students, the inability of the students to see the need for the subject.

The background influences of friends and families were shown to lie behind students' changes of course in some cases. A study on reading indicated that background factors of socio-economic status of the home, play interests and general person-

ality adjustment had no definite effect on reading ability, which suggests that they might not affect mathematics ability.

The use of the above research in the development of this thesis is shown in the following chapter.

CHAPTER II

THE PURPOSE AND PLAN OF THIS SURVEY

Purpose of the Survey

In view of the general evidence (presented in the preceding chapter) indicating more natural interest in science by the boys and languages by the girls; greater difficulty with languages by the boys, and mathematics and science by the girls; a downward trend in the study of mathematics; and the small number of women in the mathematics field; two questions are presented:

1. Why do the few girls who elect mathematics, do so?

2. What general characteristics differentiate the students who have elected mathematics from those who have not?

This study proposes to contribute some information towards the answers to these two questions in the form of factors associated with students who elect mathematics.

Many students do not themselves know why they elected mathematics; others give reasons like, "...because I like it ", which do not really answer the question, but leave the investigator with a new question, "Why do you like mathe-

matics?" which the student usually cannot answer.[1]

Is this interest and ability in the field of mathematics inborn in just a few girls? Is it a psychological quirk or accumulation of psychological factors which causes this unusual interest in mathematics? Are there some factors in the backgrounds of only some girls which might possibly influence them to elect mathematics?

In an effort to go behind the students' opinions, a questionnaire was constructed which asked only factual questions about the students' backgrounds and future plans, in order to find out which, if any, of these factors distinguished the students who elected mathematics from those who did not. Those factors which did so would cover two categories: the general characteristics of mathematics students, and the general background of activities and interests which these students have and to which they have been exposed at home and at school. (This study did not attempt to separate these two types of factors.)

The general characteristics represent effects; that is, the students possess them as a result of studying mathematics, whereas, the general background of activities and interests represents possible causes. Items such as the amount of reading the students do, cannot here be distinguished, as preced-

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1 A group of men students in a Teaching of Mathematics Seminar at Boston University was asked this question, and the answers were that they liked mathematics, they did well in mathematics, or they did not know. No one who answered that he liked mathematics, could say why he liked it.

ing or following the students' interests or activities in mathematics, or as a psychological factor not directly connected with mathematics. But wherever their origins are, they are associated with the students who elect mathematics.

These distinguishing factors could be responsible for part (or all) of the students' interests or sbilities in mathematics, and could be sufficiently influential to cause the students to elect mathematics; although other influences outside the consideration of this thesis (such as heredity or hero worship) could be partially or completely responsible for this election of mathematics.

The study did not proceed under the assumption that the background was the only possible influence on the direction of the students' scholastic pursuits or source of student characteristics. Rather, it constituted an attempt to narrow the choice of the number of possible affecting factors. Any results (positive or negative) in this connection would be a valuable contribution to the knowledge which has already been obtained on understanding the whys and wherefores of adolescent activity. And any information which can help the classroom teacher know and understand those characteristics of students in a particular type of class, which make them different from other students, can help him to be a better teacher.

Nor was it assumed that the election of mathematics was or was not a desirable procedure for girls (or for boys).

However, any possible affecting factors found would enable guidance directors to take them into consideration in advising students concerning the study of mathematics.

So far as could be determined, no previous research has been done concerning the possible factors influencing girls in the election of mathematics or the general characteristics of mathematics students, and this study is proposed as a partial investigation of this large area.

The Questionnaire

A questionnaire was built with two main points in mind. It was desired to cover the respondents' backgrounds as completely as practicable, and at the same time not to emphasize psychological factors. The background was first broken down into the four classifications: (A) personal, (B) family, (C) scholastic, and (E and F) social and interest; factual questions were then constructed to cover these areas. A section (D) was also included in the questionnaire, which was not concerned with the backgrounds of the students, but with their future plans.

Each question was formed with other related research (Chapter I) in mind. No opinion questions were included because opinions change very rapidly, and those expressed at the time of filling out the questionnaire would not necessarily reflect the opinions the respondent had at the time of filing his program. Specific reference to mathematics or

to other school subjects was avoided in order to keep any subconscious bias from coloring the answers.

Before the questionnaire was administered, ten men and women in the fields of guidance, mathematics, psychology, and social studies were consulted regarding the entire survey. Two questions were asked them:

1. Is this thesis problem worth investigating?

2. Is this questionnaire an adequate instrument for this investigation?

In addition to answering these questions they gave specific suggestions for improvement in the content and form of the questionnaire.

The general answers to the two questions above fell into three categories: (1) problem probably not worth while, (2) problem probably worth while but background factors not the important ones, and (3) problem probably worth while and this questionnaire probably adequate.

Two men gave answers in the first category.[2] Their comments were, briefly:

There is no need for this type of investigation since mathematics interest is a natural inborn interest. The only other reason for electing the fourth year of mathematics (besides interest) is for vocational preparation.

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2 Doctor Worcester Warren, Guidance Department, Boston University, School of Education, and Professor Elmer B. Mode, Mathematics Department, Boston University, College of Liberal Arts.

The direct approach of asking the students why they took mathematics is preferable.

Two men gave answers in the second category.[3] Their comments were, briefly:

The influential factors in the election of mathematics are mainly psychological ones, and the background factors are too far removed from the problem.

The direct approach of asking the student why he did or did not go into mathematics might be more revealing.

Two women and four men gave answers in the third category.[4] Their comments were, briefly:

The investigation is of interest and the questionnaire seems adequate, but the results would be of no use to a guidance director.

It is desirable to know of any background influences on the students in order to know and understand them better.

It is important to find out all we can about influences on pupils choices of subjects and enlarge our general understanding of children.

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3 Doctor Wendell Yeo, Guidance Department, Boston University, School of Education, and Ralph Ward, Chairman of the Mathematics Department, Brookline High School, Brookline, Mass.

4 Elizabeth Hamf, Guidance Director, Belmont High School, Belmont, Mass.; Miriam Loring, Mathematics Department, Belmont High School, Belmont, Mass.; G. B. Mitchell, Guidance Director, Brookline High School, Brookline, Mass.;Doctor Charles D. Moon, Psychology Department, Boston University, School of Education; Doctor Dugald S. Arbuckle, Guidance Department, Boston University, School of Education; Professor William H. Cartwright, Social Studies Department, Boston University, School of Education.

The investigation is worth doing, and the questionnaire seems adequate.

Other persons in the fields of education, theology, science, and engineering were also asked to take the questionnaire and recommend changes in content and form.[5]

The questionnaire was revised, taking all suggestions and criticisms into consideration. It was then administered to a sample population of twenty, eleventh year, college course students of both sexes. Eleventh year students were used under the assumption that questions made clear for them would certainly be clear for more mature students. The writer administered the questionnaire personally, and the respondents were encouraged to ask questions about any item which they did not completely understand. The questionnaires were then carefully checked for ambiguous answers or any indications of misunderstood items. On the basis of this examination and the students' questions while answering the questionnaire, it was again revised.

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5 Eleanor E. Dean, Electrical Engineer, Somerville, Massachusetts; Terence R. Hudson, Architect, Long Beach, California; Doctor A. L. Lyons, Research Associate, Massachusetts Institute of Technology, Cambridge, Massachusetts; Ali M. Naqvi, Astronomy Department, Harvard University, Cambridge, Massachusetts; Indraprasad Patel, Economics Department, Cambridge University, Cambridge, England; James B. Patrick, chemistry student, Massachusetts Institute of Technology, Cambridge, Massachusetts; Doctor Joseph C. Patrick, former President of Thiokol Corporation, Trenton, New Jersey; The Reverend Earl Riddle, Assistant Pastor College Avenue Methodist Church, Somerville, Massachusetts; Dr. Richard N. Thomas, Astronomy Department, Harvard University, Cambridge, Massachusetts; and the members of the Teaching of Mathematics Seminar, Boston University, School of Education, Boston, Massachusetts.

Other specific reasons for the inclusion of each question used on the completed questionnaire, as shown in Charts I, II, and III, follow:

A-1 was included to indicate any possible influences in the age differences of the students.

A-2 was included to permit classification of the respondents as males or females.

A-3 was included to indicate any possible influence by different religious faiths. A Catholic viewpoint on the study of mathematics by women has been given by Sister Helen Sullivan. The idea that women should be fostered along feminine lines, and the accent for them placed on cultural and philosophic viewpoints was presented. Some study, but no intensification, of mathematics was advocated. "Woman is meant to be a universalist, and specialization, because it limits her, is usually fatal to her proper function", she wrote.[6]

It was also alleged by a high school guidance director that many engineering schools have strict quotas as to the number of Jewish students they admit, and this influences the students in their scholastic plans.

B-1 was included to indicate any possible influences resulting from broken homes. Adjustment at school has been

6 Sister Helen Sullivan, "Mathematics for Women", Catholic Education Review, 45:163, March 1947.

CHART I

Please do not sign your name. There is NO interest in the student's answers as related to the individual student. The answers to these questions are to be used in a general study of high school seniors.

Fill in all blanks. Make your answers specific, but brief.

When you are given a choice of answers, indicate with a check mark (✓) which one or ones you choose.

FILL IN ALL BLANKS AS ACCURATELY AS YOU CAN. WHEN YOU ARE GIVEN A CHOICE OF ANSWERS, MARK WITH A CHECK (✓) THE ONE YOU CHOOSE.

A. 1. Age to nearest birthday:_____years.

2. Sex: Female____, Male ____.

3. Religion: Protestant____, Jew____, Catholic____, Other____.

B. 1. Marital status of parents: Married____, Separated or divorced____, Either one dead____.

IF YOU HAVE PARENTS AND STEP PARENTS THE FOLLOWING QUESTIONS REFER TO THE ONES YOU ARE LIVING WITH.

2. If father and/or mother are living give: Father's age_____, Mother's age_____.

3. a) Father's occupation is (or was)_____
(Be specific. For example; say, "refrigerator salesman" not "salesman".)

b) Is he owner (or part owner) of the business in which he works? Yes__No____.

4. Mother's occupation is _____
(If housewife, say so.)

5. a)Father's education: Elementary school____, High School____, College ____,

Other (indicate what) _____.

b)If college, what was father's major subject? _____.

6. a)Mother's education: Elementary school____, High School____, College ____,

Other (Indicate what) _____

b) If college, what was mother's major subject? _____.

7. a) How many living brothers do you have? (Include half or step-brothers)_____.

b) What are their ages? _____

c) If any work, what are their occupations? (Be specific) _____

_____

_____

8. a) How many living sisters do you have? (Include half or step-sisters)_____.

b) What are their ages? _____

shown to be influenced by poor marital status of parents (one or both dead, or divorced).[8] The choice of electives was considered as part of school adjustment.

B-2 was included to indicate any possible influences resulting from younger or older than average parents. Older parents were considered as possibly believing that women did not belong in a man's field; such as, mathematics. Younger parents were considered as possibly having the opposite belief.

B-3a was included to indicate any possible influences resulting from the manner in which the respondents' fathers were employed. Occupations in the fields of mathematics or science were considered as possible influencing factors.

B-3b was included to modify the nature of the fathers' occupations (B-3a), and to provide another possible source of influence.

B-4 was included to indicate any possible influence resulting from the fact that the respondents' mothers did work, or from the types of positions these mothers held. A working mother was considered as possibly having a more open-minded viewpoint on preparing for a career, especially in a traditionally man's field, than a housewife.

B-5a, B-5b, B-6a, and B-6b were included to indicate any possible influences resulting from the educational level

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8 James F. Bursch, "Home and Community Conditions Related to Pupil Maladjustment", National Elementary Principal, 15:323, July, 1936.

c) If any work, what are their occupations? (Be specific) _____

_____

9. List the hobbies of your mother, father, brothers, or sisters. Do not list your own hobbies. One person may have more than one hobby.

Mother's hobbies	Father's hobbies	Brothers' hobbies	Sisters' hobbies

10. Name any foreign languages spoken in your home more often than English.

_____

11. Write the number of the following types of rooms there are in your home:

Kitchen____, Living room ____, Dining room___, Bathrooms___, Bedrooms ____,

Others____. (If one room is used for more than one purpose, count it only once.)

C. 1. In the following tables, check the subjects you took in your tenth and eleventh years of school, and indicate the final marks received in each subject. For

For example:

English	✓	B
Mathematics		
History	✓	C

YEAR 10 Subject		Final Mark
English		
Math.		
History		
Language (indicate which)		
Language (indicate which)		
Science (indicate which)		
Music		
Art		
Others (name them)		

YEAR 11 Subject		Final Mark
English		
Math.		
History		
Language (indicate which)		
Language (indicate which)		
Science (indicate which)		
Music		
Art		
Others (name them)		

2. List the subjects you are now taking: _____

_____

_____

D. 1. Indicate your plans for the future, by checking the following:

College ___ If so what course? Liberal Arts ____, Medical or Dental____, Science or Engineering ____

Business ____, Teaching ____, Junior College _____. Undecided _____

of the respondents' parents. It was considered that students might be inclined to pursue the same courses of study as their parents had, or be influenced by the familiarity of their parents (through their educational experience) with high school and college courses in general.

B-7a, B-7b, B-7c, B-8a, B-8b, and B-8c were included to indicate any possible influences resulting from the number, ages and occupations of the respondents' siblings. It was considered that having brothers (particularly older brothers), or exposure to mathematical or scientific vocations might influence girls to enter the field of mathematics.

B-9 and F-3 were included to indicate any possible influences resulting from the types of hobbies pursued by the respondents and other members of their families, in view of the sex differences in interests noted in the preceding chapter.

B-10 was included to indicate any possible influences resulting from bi-lingualism (a school adjustment factor) or old country attitudes on woman's position in life.

B-11 was included to discover overcrowded conditions which might affect the students' study opportunities. "The facts, however, clearly indicate a significant relationship between crowded living conditions and maladjustment at school."[9]

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9 Ibid., p.320.

Business School_____.
Technical or Vocational School _____.

Working _____. Nature of the work_____

Armed Services _____.
Other (indicate what) _____

2. What is your vocational aim?_____

E. 1. List all teams, clubs, and other organized groups to which you belong:
a) connected with your school:_____

_____

b) connected with your church: _____

_____

c) others:_____

_____

2. List by type, putting your most recent position first, your working experience:

Nature of the work _____ How long you worked there

_____

_____

_____

_____

_____

F. In any of the following questions where you are given a choice of answers, you may check more than one answer.

1. a) Approximately how many books do you now read?(Do not count those required for school work)(1)_____per month, (2) _____per month during school
during vacations

b) Do you prefer: Fiction____, Non-fiction____, No preference _____.

2. How often do you go to dances or parties?_____times per month.
3. List all the hobbies you have ever taken up.

_____

_____

_____

_____

4. What two school subjects do you spend the most time on?

(1) _____ (2) _____

5. How do you generally spend your summer vacations? Working_____,

Traveling____, Summer camp____, At home____, Other (indicate how)_____

C-1 was included, in view of the sex differences in interests and ability in various subjects noted in the preceding chapter, to indicate any possible influences resulting from the different subjects studied and the grades received in them prior to the students' twelfth year.

C-2 was included to permit subclassification of the respondents' as mathematics or non-mathematics students.

E-1a, E-1b, and E-1c were included to indicate any possible influences resulting from general affiliation with different types of organized groups (also another school adjustment factor[10]).

E-2 was included to indicate any possible influences resulting from working experience.

F-1a and F-1b were included to indicate the possible influence of reading, with the strong interest females have in reading (see the preceding chapter) in mind.

F-2 was included to indicate the possible influence of social activities.

F-3 was discussed under B-9.

F-4 was included to indicate the possible influence of the amount of time spent on a particular school subject.

F-5 was included to indicate the possible influence of the way the respondents spent their vacations.

D-1 and D-2 are not strictly background factors and were included to indicate the extent of the influence of the

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[10] Ibid., p. 323.

respondents' future plans (scholastic or business future and vocational aims), because a large number of the persons consulted by the writer believed this to be the most important influential in the election of mathematics.

The Respondents

This inquiry was administered to college course seniors of both sexes. Seniors only were chosen because many high schools require the college course students to take three years of mathematics. The seniors, then, are the only students in the position of deciding whether or not to elect mathematics. Both sexes were included in order to provide a means of isolating the factors pertaining to the female mathematics students only, from those pertaining to both male and female mathematics students.

The questionnaires were filled out at home, giving the students an opportunity to consult with their parents about any questions on their family background to which they did not know the answers.

Two hundred seventy-five questionnaires were distributed to five different schools in Massachusetts and New York. Each school was in a community falling into a different population classification (see Table I-A) in an attempt to secure a reliable sample of students.

TABLE I-A

THE CLASSIFICATION OF PARTICIPATING SCHOOLS BY THE POPULATION OF THEIR COMMUNITIES AND THE NUMBER OF QUESTIONNAIRES

SCHOOL	COMMUNITY POPULATION	NUMBER OF QUESTIONNAIRES
School I	5,000--10,000	75
School II	10,000--25,000	19
School III	25,000--50,000	17
School IV	100,000--150,000	113
School V	over 7,000,000	51
		275

The largest number of questionnaires (113) were submitted to School IV, located in a manufacturing city of over 100,000 population, which had only one high school. Seventy-five went to school I, located in a residential community in the 5,000 to 10,000 population class. Fifty-one went to School V in an extremely large and heterogeneous city supporting many high schools. The remaining fifty-seven were distributed to the three other schools, located in typical cities in the 10,000 to 100,000 population classes.

Anonymity was stressed; nevertheless, objection was raised to question A-3 in School IV, and it was therefore crossed off the questionnaire for those fifty-one students.

The tabulated results of this survey, and the conclusions drawn from them will be presented in the following chapters.

CHAPTER III

RESULTS OF THE SURVEY

Concerning the Tabulation of the Questionnaires

The answers to this survey were tabulated separately for those students who were taking their fourth year of high school mathematics and for those students who were pursuing some other type of program. These two divisions were labeled Math Students and Non-Math Students respectively, even though some of the Non-Math Students had as much as three years of high school mathematics in their backgrounds. Each division was subdivided into male and female classifications. The results of this tabulation are presented in the tables, Figures, explanatory notes, and discussion of this chapter.

Of the 275 questionnaires filled out, fourteen had to be discarded. These were discarded because question C-2 (asking for a list of the subjects now being studied by the student) was not answered. There was no way of determining whether the respondents were Math or Non-Math Students without the answer to C-2.

Concerning the Participating Schools and the Group Classifications

The number of questionnaires used in the final analysis from each school, and the sex of the respondents is shown in Table I-B. Examination of this table reveals the fact that 122 females and 139 males participated in the survey, which figures

TABLE I-B

QUESTIONNAIRE ANALYSIS BY SCHOOLS

	No. of Questionnaires	% of Total	No. of Females	% of Total	No. of Males	% of Total
School I	69	26.4	30	11.5	39	14.9
School II	19	7.8	9	3.5	10	3.8
School III	16	6.4	11	4.2	5	1.9
School IV	106	40.6	54	20.7	52	20.0
School V	51	19.5	18	6.9	33	12.6
Total	261	100.0	122	46.8	139	53.2

are sufficiently close to consider the females and males as equally represented. In schools I, II, and IV the number of females and males are approximately equal. There are over twice as many females as males from school III, but since only 6.4 per cent of the respondents came from this school, this can be overlooked. There are slightly less than twice as many males as females from school V. This group represents 19.5 per cent of the participants, and it would be more desirable to have a closer equality.

The respondents from school V were all in the Math group. The respondents from schools I, II, III, and IV fell into both groups. Table I-C shows the number and percentages of students occurring in each group and subgroup (based on 261 questionnaires used in the final analysis).

One hundred and eleven of the 261 questionnaires used fell into the Math group and 150 into the Non-Math group. Of the 111

TABLE I-C

GROUPING ANALYSIS BY SCHOOLS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
School I	2	0.7	20	7.7	22	8.4	28	10.7	19	7.3	47	18.0
School II	1	0.4	8	3.7	9	3.5	8	3.7	2	0.7	10	3.8
School III	1	0.4	3	1.1	4	1.5	10	3.8	2	0.7	12	4.6
School IV	3	1.1	22	8.4	25	9.6	51	19.6	30	11.5	81	31.0
School V	18	6.9	33	12.6	51	19.6	0	0.0	0	0.0	0	0.0
Total	25	9.5	86	33.5	111	42.6	97	37.8	53	20.2	150	57.4

in the Math group, twenty-five were answered by females and eighty-six by males; of the 150 in the Non-Math group ninety-seven were answered by females and fifty-three by males. These subtotals are the ones upon which the accompanying calculations were based, unless otherwise indicated. All percentages were corrected to the nearest one-tenth. Where questions were unanswered (except C-2) percentages were based on the total number of respondents rather than the number of answers to the specific question, and the number of blank replies were included in the data. This was done in order to maintain an accurate comparison of the same groups in regard to all questions. Very small changes are incurred if the blank replies are discarded and the percentages computed on the basis of the number answering each particular question. The possibility of changes resulting from different distributions of the blank replies (where there is a sufficient number of them to make any difference) are considered in the interpretations of each question. Only in the case of questions B-2, A-3, B-3b, and D-2 are the results changed by a factor of 1.1 or more, (A-3: 2.8; B-2: 1.2; B-3b: 1.2; and D-2: 1.6). In all the other questions the factor to the nearest tenth is approximately 1.0.

General Breakdown of the Questions

Tables II and III contain personal information about the students, tables IV-XII are concerned with the students' family backgrounds, and tables XIII-XVII with the students' scholastic

backgrounds. Tables XVIII-A, XVIII-B, and XVIII-C deal with students' future plans, while tables XIX-XXV involve the students' social and interest patterns.

Personal Data Concerning the Respondents

Table II and Figures 1-A and 1-B show the ages of the students in one year intervals from sixteen to twenty years. Inspection of the table and figures reveals that the Total groups show small differences in the age ranges of the students, while the Maths have more members in the eighteen-year old class. The Math-Female group has no students in the nineteen or twenty-year old classes, whereas the Non-Math-Females have 5.0 per cent, the Math-Males 7.0 per cent, and the Non-Math-Males 15.1 per cent in these classes. This indicates a slight tendency for the Math-Female group to contain fewer older students than the other groups, but does not indicate that this group has younger members than the other groups. (Note that 64.0 per cent of the Math-Females are eighteen years old, while only 50.5 per cent of the Non-Math-Females and 49.0 per cent of the Non-Math-Males are in this age class.)

Table III shows the religion of the students as Protestant, Jewish, Catholic, or Other (Question A-3). Due to the fact that 37.9 per cent of the Math group gave no answer to this question, the results are somewhat incomplete. However, since all the blank replies were from school VI, which did not have any participants in the Non-Math group, these results can be accepted

TABLE II

AGES OF THE RESPONDENTS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Age	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
16	1	4.0	1	1.2	2	1.8	2	2.1	0	0.0	2	1.3
17	8	32.0	26	30.2	34	30.6	41	42.3	18	34.0	59	39.3
18	16	64.0	53	61.6	69	62.2	49	50.5	26	49.0	75	50.0
19	0	0.0	4	4.7	4	3.6	5	5.1	7	13.2	12	8.0
20	0	0.0	2	2.3	2	1.8	0	0.0	1	1.9	1	0.7
No Answer	0	0.0	0	0.0	0	0.0	0	0.0	1	1.9	1	0.7

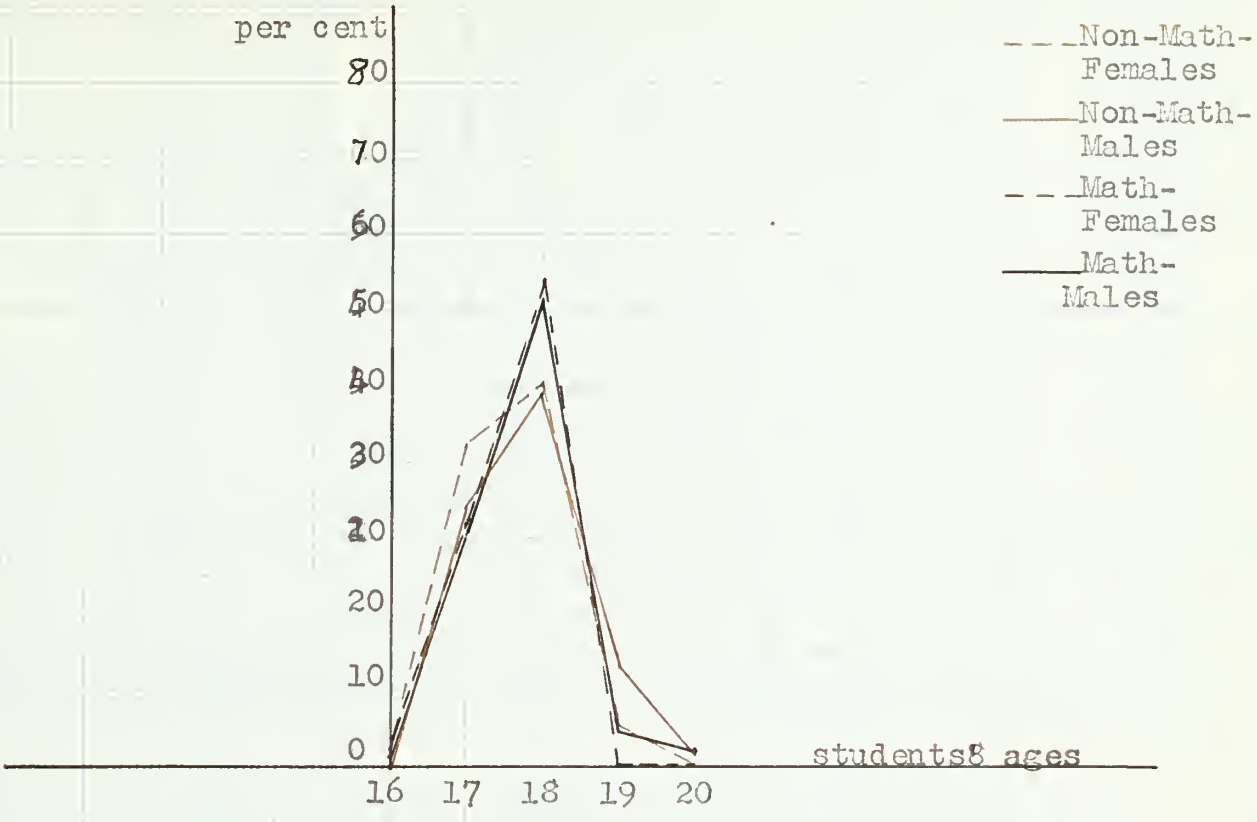


FIGURE 1-A
COMPARISON OF RESPONDENTS' AGES FOR ALL THE SUBGROUPS

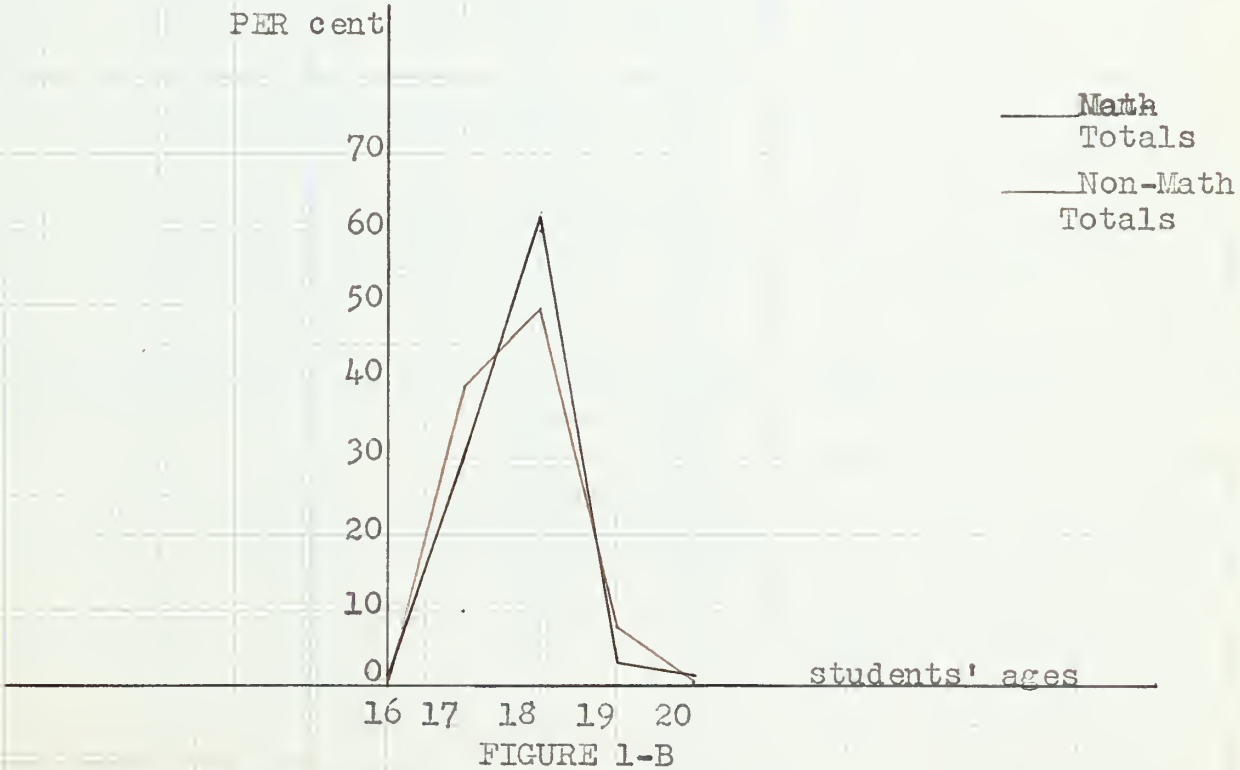


FIGURE 1-B
COMPARISON OF RESPONDENTS' AGES FOR THE TOTAL GROUPS

TABLE III

RELIGION OF THE RESPONDENTS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Religion	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Protestant	3	12.0	29	33.7	32	28.8	43	44.3	21	39.6	64	42.7
Jewish	4	16.0	12	14.0	16	14.4	5	5.2	4	7.5	9	6.0
Catholic	2	8.0	14	16.3	16	14.4	39	4.02	20	37.8	59	39.3
Other	0	0.0	5	5.8	5	4.5	10	10.3	8	15.1	18	12.0
No answer	16	64.0	26	30.2	42	37.9	0	0.0	0	0.0	0	0.0

as indicating some tendencies; although the nine Math-Females form too small a group to carry much significance. The Math group has more Jewish students and the Non-Math group more Catholic students. The Male Female comparison within the Math group shows twice as many male Catholics as females. If the members of the No Answer class were distributed in the same proportions as the other members of the various groups, the relations of the Total groups would not change, but the Math-Female would show a slightly higher percentage than the Math-Males in the Catholic class and a 30.0 per cent larger percentage in the Jewish class. Non-proportional distributions could result in the predominance for the Maths in any one class, but they would always maintain a larger percentage of Jewish members.

Concerning the Family Backgrounds of the Respondents

Table IV shows the marital status of the students' parents (Question B-1). This table reveals that 4.9 per cent more Non-Math than Maths come from broken homes. There is little difference between the Math-Males and the Math-Females. The Non-Math-Females have 8.2 per cent more separated or divorced parents than the Math-Females.

Tables V-A and V-B and Figures 2-A, 2-B, 2-C, and 2-D show the ages of the students' fathers and mothers (Question B-2) in ten year intervals. For all groups, the majority of fathers and mothers fell in the 41-50 year classification. There are no significant differences in the age ranges. A slight tendency is

TABLE IV

MARITAL STATUS OF THE RESPONDENTS' PARENTS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Status	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Married	24	96.0	77	89.5	101	91.0	83	85.6	47	88.6	130	86.6
Separated or Divorced	0	0.0	2	2.3	2	1.8	8	8.2	2	3.8	10	6.7
One Dead	1	4.0	6	7.0	7	6.3	6	6.2	3	5.7	9	6.0
No Answer	0	0.0	1	1.2	1	0.9	0	0.0	1	1.9	1	0.7

TABLE V-A

AGES OF THE RESPONDENTS' FATHERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Years	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
21-30	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	0.7
31-40	1	4.0	5	5.8	6	5.4	7	7.2	3	5.7	10	6.7
41-50	13	52.0	46	53.5	59	53.2	46	47.5	22	41.5	68	45.3
51-60	7	28.0	19	22.1	26	23.4	29	29.9	13	24.5	42	28.0
61-70	0	0.0	3	3.5	3	2.7	3	3.1	4	7.5	7	4.6
71-80	0	0.0	0	0.0	0	0.0	0	0.0	1	1.9	1	0.7
No Answer	4	16.0	13	15.1	17	15.3	11	11.3	10	18.9	21	14.0

TABLE V-B

AGES OF THE RESPONDENTS' MOTHERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Years	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
21-30	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
31-40	2	8.0	10	11.7	12	10.8	16	16.5	6	11.3	22	14.6
41-50	18	72.0	59	68.6	77	69.4	63	65.0	32	60.4	95	63.4
51-60	3	12.0	6	7.0	9	8.1	10	10.3	8	15.1	18	12.0
61-70	0	0.0	1	1.2	1	0.9	1	1.0	0	0.0	1	0.7
71-80	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
No Answer	2	8.0	10	11.7	12	10.8	7	7.2	7	13.2	14	9.3

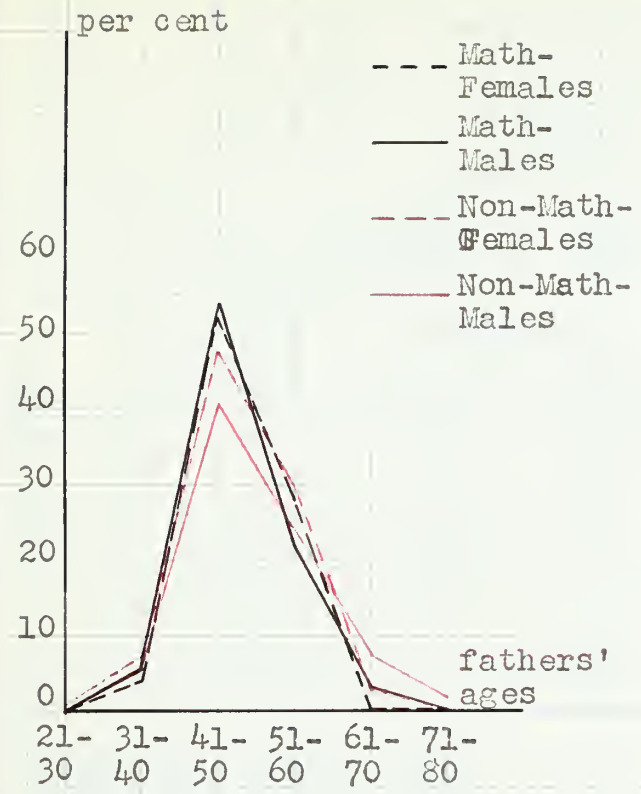


FIGURE 2-A
COMPARISONS OF FATHERS' AGES
FOR ALL SUBGROUPS

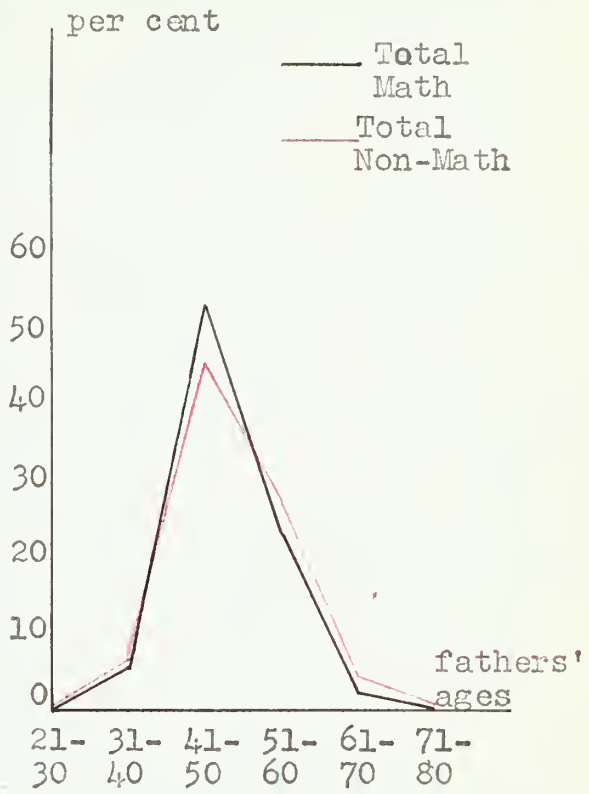


FIGURE 2-B
COMPARISONS OF FATHERS' AGES
FOR THE TOTAL GROUPS

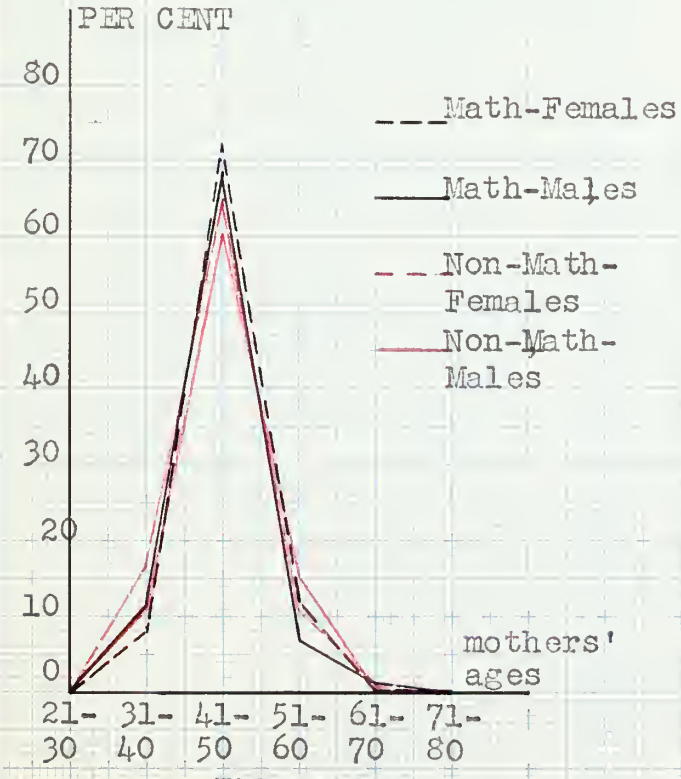


FIGURE 2-C
COMPARISONS OF MOTHERS' AGES
FOR ALL SUBGROUPS

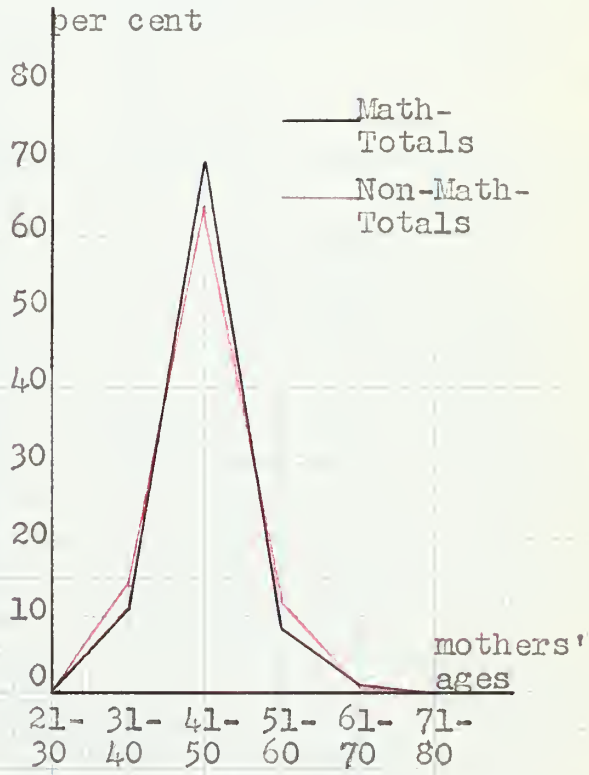


Figure 2-D
COMPARISONS OF MOTHERS' AGES
FOR THE TOTAL GROUPS

seen for the Math group and the Math-Females in particular, to contain fewer younger and fewer older parents than the Non-Math group.

Table VI-A shows the occupations of the students' father (Question B-3a) classified as Math, Science, or Other. Engineering and accounting were considered as Math occupations; pure science, medicine, dentistry, optometry, and pharmacy were considered as Science occupations. More Math fathers, and Math-Females' fathers in particular, are employed in mathematical or scientific occupations than Non-Math fathers.

Table VI-B shows these same occupations classified as Unskilled, Skilled, Business-Manufacturing, Business-Managing, Professional, Supervisory, Buying-Selling, and Others. Unskilled includes retail salesmen, janitors, delivery men, and general factory workers. Skilled includes all trades and occupations demanding specific training or experience. Business-Manufacturing includes large wholesalers and manufacturers. Business-Managing includes executive positions in larger businesses, small retail store owners, and restauranteurs. Professional includes engineers, lawyers, doctors, dentists, educators, optometrists, druggists, accountants, two advertising men, and one forest ranger. Supervisory includes prison guards and officers and factory foremen, as well as all supervisors over a large group of workers. Buying-Selling includes wholesale salesmen and buyers. The one Other listed was an insurance investigator in the Math-Male group.

TABLE VI-A

OCCUPATIONS OF THE RESPONDENTS' FATHERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Field	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Math	5	20.0	8	9.3	13	11.7	8	8.2	3	5.7	11	7.3
Science	4	16.0	3	3.5	7	6.3	1	1.0	1	1.9	2	1.3
Other	16	64.0	75	87.2	91	82.0	88	90.7	46	86.9	134	89.4
No Answer	0	0.0	0	0.0	0	0.0	0	0.0	3	5.7	3	2.0

TABLE VI-B

OCCUPATIONS OF THE RESPONDENTS' FATHERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Occupation	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Unskilled	1	4.0	12	13.9	13	11.7	20	20.6	15	28.3	35	23.3
Skilled	3	12.0	12	13.9	15	13.5	13	13.4	9	17.0	22	14.7
Business-Manufacturing	1	4.0	11	12.8	12	10.8	10	10.3	3	5.7	13	8.7
Business-Managing	5	20.0	15	20.3	20	28.0	28	28.8	4	7.5	32	21.3
Professional	12	48.0	19	25.7	31	27.9	14	14.4	6	11.3	20	13.3
Supervisor	1	4.0	6	8.1	7	6.3	7	7.2	6	11.3	13	8.7
Buying-Selling	2	8.0	9	11.3	11	9.9	5	5.2	7	13.2	12	8.0
Other	0	0.0	1	1.2	1	0.9	0	0.0	0	0.0	0	0.0
No Answer	0	0.0	1	1.2	1	0.9	0	0.0	3	5.7	3	2.0

Examination of these results reveals fairly equivalent representation in all groups for all classes with the exception of Professional and Unskilled. The Professional class has more than twice as many Maths as Non-Maths, almost twice as many Math-Females as Math-Males, and more than three times as many Math-Females as Non-Math-Females. Approximately the reverse holds true for the unskilled class.

Table VI-C shows the Yes or No response to Question B-3b, "Is he" (father) "owner (or part owner) of the business in which he works?" The Math group has more fathers who own (or partly own) their own businesses. Although more Maths than Non-Maths omitted the answer to Question B-3b, their answers, no matter how distributed, could not change the tendency for the Math group to have more members in the Yes class than the Non-Maths.

Table VII shows the occupations of the students' mothers (Question B-4), classified in the same manner as the fathers' occupations in table VI-A, with the addition of two classifications: Housewife and Working (Total). This table reveals that although there is no particular difference between the per cent of working mothers of the Maths and the Non-Maths, the per cent for the Math-Females exceeds the Non-Math-Females by 16.3 per cent, and the Math-Males by 20.9 per cent. A tendency is also shown for the Math-Females to have more mothers employed in a scientific field.

Tables VIII-A and VIII-B show the students' fathers' and mothers' education (Questions B-5a and B-6a). The classes used

TABLE VI-C

DO THE RESPONDENTS' FATHERS OWN THEIR OWN BUSINESSES?

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Answer	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	10	40.0	33	38.4	43	38.7	24	24.8	10	18.9	34	22.7
No	10	40.0	44	51.2	54	48.7	65	67.0	40	75.4	105	70.0
No Answer	5	20.0	9	10.4	14	12.6	8	8.2	3	5.7	11	7.3

TABLE VII

OCCUPATIONS OF THE RESPONDENTS' MOTHERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Field	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Housewife	15	60.0	69	80.2	84	75.6	76	78.4	44	83.0	120	80.0
Math	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Science	2	8.0	0	0.0	2	1.8	0	0.0	0	0.0	0	0.0
Other	7	28.0	13	15.1	20	18.0	19	19.7	7	13.2	26	17.3
No Answer	1	4.0	3	3.5	4	3.6	2	2.1	2	3.8	4	2.7
Working	9	36.0	10	15.1	22	19.8	19	19.7	7	13.2	26	17.3

TABLE VIII-A

EDUCATION OF THE RESPONDENTS' FATHERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Level	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
None	0	0.0	2	2.3	2	1.8	1	1.0	2	3.8	3	2.0
Elementary	5	20.0	26	30.2	31	27.9	19	19.6	10	18.9	29	19.3
High	3	12.0	23	26.8	26	23.4	50	51.5	26	49.0	76	50.7
Beyond High	0	0.0	2	2.3	2	1.8	0	0.0	3	5.7	3	2.0
College	11	44.0	23	26.8	34	30.6	25	25.8	11	20.9	36	24.0
Beyond College	5	20.0	4	4.7	9	8.1	0	0.0	0	0.0	0	0.0
Foreign	1	4.0	2	2.3	3	2.7	0	0.0	0	0.0	0	0.0
Self	0	0.0	0	0.0	0	0.0	2	2.1	0	0.0	2	1.3
No Answer	0	0.0	4	4.7	4	3.6	0	0.0	1	1.7	1	0.7

TABLE VIII-B

EDUCATION OF THE RESPONDENTS' MOTHERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Level	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
None	0	0.0	1	1.2	0	0.0	4	4.1	2	3.8	6	4.0
Elementary	8	32.0	20	23.0	28	25.5	21	21.6	12	22.6	33	22.0
High	7	28.0	41	47.7	48	43.7	49	50.5	26	49.0	75	50.0
Beyond High	1	4.0	0	0.0	1	0.9	2	2.1	3	5.7	5	3.3
College	7	28.0	22	25.6	29	26.4	21	21.6	8	15.1	29	19.3
Beyond College	2	8.0	0	0.0	2	1.8	0	0.0	0	0.0	0	0.0
Foreign	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Self	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
No Answer	0	0.0	2	2.3	2	1.8	0	0.0	2	3.8	2	1.3

were: None, Elementary, High, Beyond High, College, Beyond College, Foreign, and Self. Beyond High includes night, business, and vocational school. Beyond College includes the Masters' and Doctors' levels. Foreign and Self education were taken as such from the students' answers, and in no case was there any further information indicating placement in any of the other classifications.

Figures 3-A-3-F and 4-A-4-F are the histograms of the fathers' and mothers' cumulative education, comparing the percentages of parents who have completed each classification level. These results reveal a much higher educational level for the Math group as a whole than for the Non-Maths, and for the Math-Female sub-group than for any other subgroup. This tendency is more pronounced in the fathers' education than in the mothers'. The Math group only has parents with an educational level beyond college, and the Math-Female sub-group only has mothers on this level. The Math group, and the Math-Female sub-group in particular has more parents with elementary education only than the Non-Math group.

Tables IX-A and IX-B show the major subjects of the fathers and mothers who went to college (Questions B-5b and B-6b). These subjects were classified as Business, Education, Science, Law, English, Social Studies, Languages, Medicine. Mathematics, Engineering, Agriculture, Music-Art, Religion, Home Economics, and General. One father majored in lumber and was classified under agriculture. The combined points for

FIGURE 3

MAXIMUM EDUCATION OF FATHERS

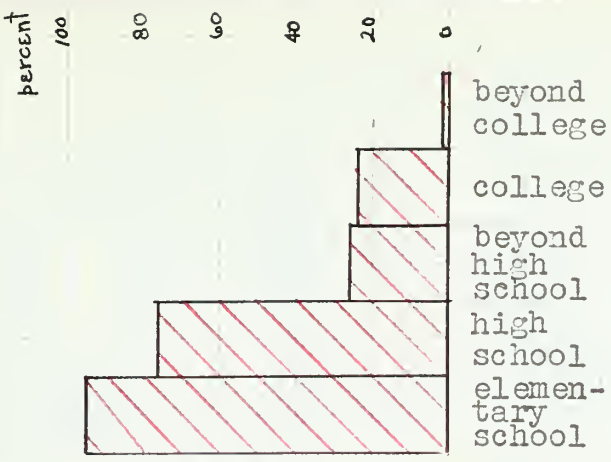
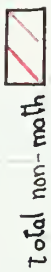


FIGURE 3-F



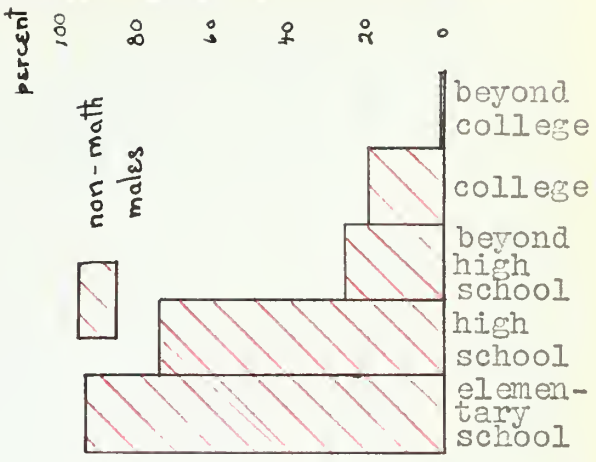


FIGURE 3-D

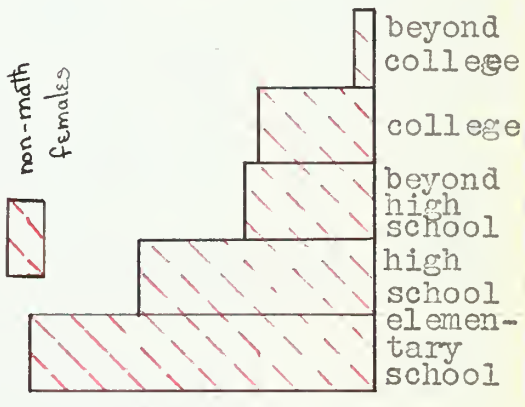


FIGURE 3-C

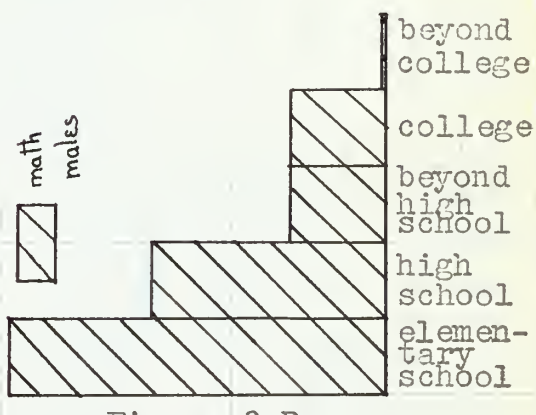


Figure 3-B

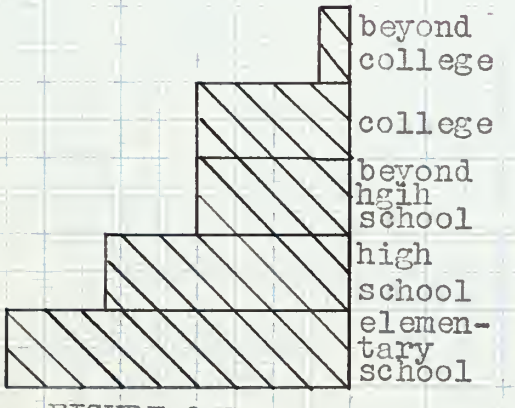


FIGURE 3-E

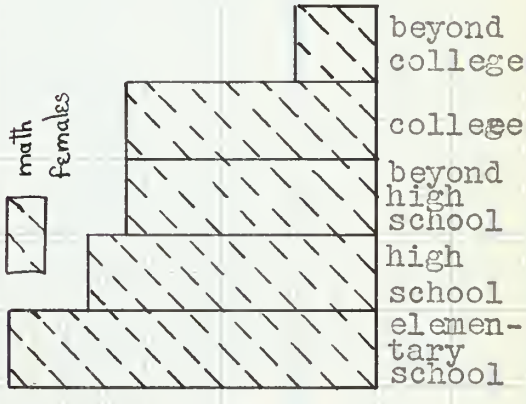


Figure 3-A

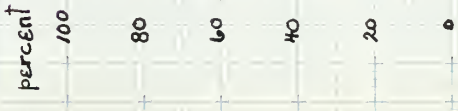


FIGURE 4

MAXIMUM EDUCATION OF MOTHERS

FIGURE 4-A

FIGURE 4-B

FIGURE 4-C

FIGURE 4-D

FIGURE 4-E

FIGURE 4-F

TABLE IX-A

MAJOR COLLEGE SUBJECTS OF RESPONDENTS' FATHERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Subject	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Business	1	4.0	3	3.5	4	3.6	5	5.2	0	0.0	5	3.3
Education	0	0.0	1	1.2	1	0.9	1	1.0	1	1.9	2	1.3
Science	4	16.0	2	2.3	6	5.5	4	4.1	1	1.9	5	3.3
Law	2	8.0	2	2.3	4	3.6	3	3.1	0	0.0	3	2.0
English	0	0.0	0	0.0	0	0.0	2	2.1	2	3.8	4	2.7
Social Studies	1	4.0	0	0.0	1	0.9	0	0.0	1	1.9	1	0.7
Languages	1	4.0	1	1.2	2	1.8	0	0.0	0.	0.0	0	0.0
Medicine	0	0.0	1	1.2	1	0.9	0	0.0	0	0.0	0	0.0
Mathematics	3	12.0	2	2.3	5	4.6	0	0.0	0	0.0	0	0.0
Engineering	3	12.0	11	12.8	14	12.7	7	7.2	2	3.8	9	6.0
Agriculture	0	0.0	0	0.0	0	0.0	1	1.0	1	1.9	2	1.3
General	0	0.0	0	0.0	0	0.0	0	0.0	1	1.9	1	0.7
No Answer	1	4.0	4	4.7	5	4.6	2	2.1	1	1.9	3	2.0
Science-Medicine	4	16.0	3	3.5	7	6.3	4	4.1	1	1.9	5	3.3
Engineering-Mathematics	6	24.0	13	15.3	19	17.3	7	7.2	2	3.8	9	6.0
Total	10	40.0	16	18.8	26	23.6	11	11.3	3	5.7	14	9.3

TABLE IX-B

MAJOR COLLEGE SUBJECTS OF RESPONDENTS' MOTHERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Subject	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Business	0	0.0	4	4.7	4	3.6	4	4.1	2	3.8	6	4
Education	2	8.0	4	4.7	6	5.4	1	1.0	1	1.9	2	1.3
Science	2	8.0	1	1.2	3	2.7	0	0.0	0	0.0	0	0.0
Law	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
English	1	4.0	1	1.2	2	1.8	1	1.0	1	1.9	2	1.3
Social Studies	2	8.0	2	2.3	4	3.6	2	2.1	0	0.0	2	1.3
Languages	0	0.0	3	3.5	3	2.7	1	1.0	0	0.0	1	0.7
Medicine	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Mathematics	0	0.0	2	2.3	2	1.8	1	1.0	0	0.0	1	0.7
Engineering	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Agriculture	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
General	0	0.0	1	1.2	1	0.9	0	0.0	1	1.9	1	0.7
Music-Art	1	4.0	1	1.2	2	1.8	2	2.1	0	0.0	2	1.3
Religion	1	4.0	0	0.0	1	0.9	0	0.0	0	0.0	0	0.0
Home Economics	0	0.0	2	2.3	2	1.8	1	1.0	1	1.9	8	5.3
No Answer	0	0.0	1	1.2	1	0.9	2	2.1	2	3.8	4	2.7
Science-Medicine	2	8.0	1	1.2	3	2.7	0	0.0	0	0.0	0	0.0
Engineering-Mathematics	0	0.0	2	2.3	2	1.8	1	1.0	0	0.0	1	0.7
Total	2	8.0	3	3.5	5	4.5	1	1.0	0	0.0	1	0.7

Science and Medicine; Mathematics and Engineering; and the Total for these four classes (Medicine, Mathematics, Science, and Engineering) were also tabulated. It is important to note that these percentages were based on the same subtotals as in the preceding tables, although all the respondents did not have parents who went to college, because it was desired to know the percentage of the entire sub-group that was exposed to each factor.

More Math fathers majored in science, mathematics, and engineering at college than Non-Math fathers. This difference is especially noticeable for the Math-Females compared to all other sub-groups. More Math mothers majored in social studies, education and science than Non-Math mothers. These three classes have equal rating in the Math-Female sub-group.

Tables X-A and X-B show the numbers of brothers and sisters of the respondents. Table X-C classifies the respondents' families according to the number of children. Tables X-D and X-E show the brothers' and sisters' ages in five-year intervals. The percentages in these two tables are based on the total number of brothers or sisters recorded for each group, instead of the number of students in each group.

Table X-A reveals that more Math-Females have no brothers than Math-Males or Non-Math-Females. Table X-B reveals the same tendency as regards sisters. Table X-C corroborates this tendency, showing more Math-Females as only children or one of two children than any other group. In general smaller families

TABLE X-A

NUMBERS OF BROTHERS OF THE RESPONDENTS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Number	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	14	56.0	31	28.1	45	40.5	26	26.8	19	35.8	45	30.0
1	9	36.0	35	31.8	44	39.6	43	44.4	17	32.0	60	40.0
2	2	8.0	15	13.7	17	15.4	19	19.6	8	15.1	27	18.0
3	0	0.0	5	5.8	5	4.5	7	7.2	6	11.3	13	8.7
4	0	0.0	0	0.0	0	0.0	1	1.0	2	3.8	3	2.0
5	0	0.0	0	0.0	0	0.0	1	1.0	1	1.9	2	1.3
6	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

TABLE X-B

NUMBERS OF SISTERS OF THE RESPONDENTS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Number	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	15	60.0	34	39.5	49	44.2	42	43.3	23	43.3	65	43.3
1	9	36.0	35	40.6	44	39.6	37	38.2	17	32.0	54	36.0
2	1	4.0	12	13.9	13	11.7	6	6.2	6	11.3	12	8.0
3	0	0.0	3	3.5	3	2.7	6	6.2	4	7.5	10	6.7
4	0	0.0	1	1.2	1	0.9	5	5.2	2	3.8	7	4.7
5	0	0.0	1	1.2	1	0.9	0	0.0	0	0.0	0	0.0
6	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	0.7
7	0	0.0	0	0.0	0	0.0	0	0.0	1	1.9	1	0.7

TABLE X-C

CHILDREN IN THE RESPONDENTS' FAMILIES

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Number	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	7	28.0	9	10.5	16	14.4	7	7.2	11	20.7	18	12.0
2	14	56.0	30	34.9	44	39.6	42	43.3	10	18.9	52	34.6
3	2	8.0	24	27.9	26	23.4	19	19.6	15	28.3	34	22.7
4	2	8.0	18	20.9	20	18.0	10	10.3	8	15.1	18	12.0
5	0	0.0	1	1.3	1	0.9	9	9.3	2	3.8	11	7.4
6	0	0.0	3	3.5	3	2.7	6	6.2	4	7.5	10	6.7
7	0	0.0	1	1.3	1	0.9	2	2.1	1	1.9	3	2.0
8	0	0.0	0	0.0	0	0.0	1	1.0	1	1.9	2	1.3
9	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	0.7
10	0	0.0	0	0.0	0	0.0	0	0.0	1	1.9	1	0.7

are indicated for the Maths than for the Non-Maths, and much smaller families for the Math-Females than for any other group.

Table X-D shows little differences in the range of ages of the respondents' brothers for the Total groups. The Math group has slightly more members in the 11-15 class (5.6 per cent) and slightly fewer members in the 0-5 class (4.7 per cent) than the Non-Math group. The range for the Math-Females is smaller (11-25) than any of the other sub-groups; that is, their brothers are closer to their own ages than are the brothers in the other groups. The Math-Females also have more members in the 16-20 class than any of the other sub-groups. All groups have the greatest number of their members in the 11-15 class.

Table X-E reveals no large differences in any of the groups. The Math-Females have a slightly limited range, having no members in the 26-30 or 31-up classes, while the other groups have 7-18 per cent in these two classes.

Tables X-F and X-G show the numbers and percentages of families having sons and daughters working at different occupations. The classifications are the same as those in table VI-B with the addition of the classes Student and Housewife. Table X-F also has two grouped classes: Math and Science. Math includes engineers; Science, pure and applied scientists; and Student, college students. One point was given for each brother in each family falling under a different occupation classification. (If one family listed more than one brother employed in the same manner, only one point was given.)

TABLE X-D

AGES OF THE RESPONDENTS' BROTHERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Age	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0-5	0	0	1	1.3	1	1.1	7	6.4	3	4.8	10	5.8
6-10	0	0	7	8.8	7	7.5	12	10.9	7	11.1	19	11.0
11-15	5	38.5	26	32.5	31	33.4	25	22.7	13	20.6	48	27.8
16-20	4	30.7	14	17.5	18	19.4	18	16.4	16	25.4	34	19.7
21-25	4	30.7	21	26.2	25	26.9	35	31.8	14	22.2	49	28.4
26-30	0	0.0	9	11.3	9	9.7	9	8.2	7	11.1	16	9.3
31-up	0	0.0	2	2.5	2	2.2	4	3.6	3	4.8	7	4.1
Total	13	100.0	80	100.0	93	100.0	110	100.0	63	100.0	173	100.0

TABLE X-E

AGES OF THE RESPONDENTS' SISTERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Age	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0-5	1	9.1	4	5.4	5	5.9	8	8.6	3	6.1	11	7.8
6-10	1	9.1	8	9.3	9	10.6	7	7.5	3	6.1	10	7.1
11-15	2	18.2	19	25.7	21	24.7	25	26.9	10	20.4	35	24.6
16-20	4	36.4	15	20.3	19	22.4	18	19.4	9	18.4	27	19.0
21-25	3	27.3	22	29.7	25	29.4	23	24.8	15	30.6	38	26.8
26-30	0	0.0	6	8.1	6	7.1	9	9.7	6	12.3	15	10.6
31-up	0	0.0	0	0.0	0	0.0	3	3.2	3	6.1	6	4.2
Total	11	100.0	74	100.0	85	100.0	93	100.0	49	100.0	142	100.0

Table X-F shows that approximately 70-80 per cent of the members of all the groups had no working brothers. The families of the Math group have 7.5 per cent fewer brothers who are in the Unskilled class, 3.8 per cent fewer brothers who are in the Science class, and 2.9 per cent more brothers who are in the Salesman class than the families of the Non-Math group. The Non-Math subgroups, and the Math-Males generally follow the pattern of their main groups. The Math-Female subgroup has members in only two classes: Students (16 per cent) and skilled (4 per cent). It has the highest membership in the Student class of all the groups.

Table X-G shows that approximately 70-84 per cent of all the groups had no working sisters. The Math group has 6.1 per cent fewer members in the Professional class than the Non-Math group. The Math-Female subgroup again has empty classes. They have no members in the classes: Housewife, Unskilled, Skilled, and Professional. (This is probably due partly to the small number in the Math-Female subgroup, and partly to the fact -- as shown in table X-E -- that the Math-Females have fewer brothers than the other subgroups.

Table XI shows the hobbies of the families of the students (Question B-9). The hobbies were grouped wherever possible, but twenty-three classifications were considered necessary. One type hobby was counted only once for each family, no matter how many members of the family pursued it.

TABLE X-F

OCCUPATIONS OF THE RESPONDENTS' BROTHERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Occupations	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
None	20	80.0	67	77.9	87	78.4	68	70.1	36	67.9	104	69.4
Student	4	16.0	4	4.8	8	7.2	10	10.3	3	5.7	13	8.7
Unskilled	0	0.0	5	5.8	5	4.5	9	9.3	9	17.0	18	12.0
Skilled	1	4.0	5	5.8	6	5.4	5	5.2	6	11.3	11	7.3
Salesman	0	0.0	4	4.8	4	3.6	0	0.0	1	1.9	1	0.7
Business-Manager	0	0.0	1	1.2	1	0.9	0	0.0	1	1.9	1	0.7
Professional	0	0.0	4	4.8	4	3.6	3	3.1	3	5.7	6	4.0
Armed Forces	0	0.0	0	0.0	0	0.0	2	2.1	2	3.8	4	2.7
Supervisor	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	0.7
Math	0	0.0	2	2.3	2	1.8	0	0.0	0	0.0	0	0.0
Science	0	0.0	1	1.2	1	0.9	5	5.2	2	3.8	7	4.7

TABLE X-G

OCCUPATIONS OF THE RESPONDENTS' SISTERS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Occupation	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
None	21	84.0	61	70.9	82	73.8	68	70.1	40	75.5	108	72.0
Housewife	0	0.0	10	11.6	10	9.1	8	8.2	4	7.6	12	8.0
Student	1	4.0	3	3.5	4	3.6	1	1.0	1	1.9	2	1.3
Unskilled	0	0.0	8	9.3	8	7.2	8	8.2	2	3.8	10	6.7
Skilled	2	8.0	6	7.0	8	7.2	6	6.2	6	11.3	12	8.0
Professional	1	4.0	3	3.5	4	3.6	11	11.3	5	9.4	16	10.7
Supervisor	0	0.0	1	1.2	1	0.9	1	1.0	1	1.9	2	1.3

Inspection of this table reveals more exposure of the Math groups to Cooking, Social, Photography, and Games; and less exposure to Reading, Sewing, Radio, and Dancing than the Non-Math group. Within the Math group, the females have been exposed far more to the hobby classes: Reading, Sewing, Collecting, Arts, Games, Movies, Current Events, and Traveling; and far less to the classes: Gardening, Social, Photography, and Dancing than the males. The Math-Females had greater exposure to the classes: Reading, Collecting, Cooking, Arts, Games, Movies, Current Events, and Traveling, and less exposure to: Gardening, Radio, Dancing, and Nature than the Non-Math-Females

Table XII shows the languages spoken more often than English in the students' homes (Question B-10). A larger number of families who speak another language fall into the Math group (the Math-Male subgroup in particular) than into the Non-Math group. The predominant language in the Math group is Jewish, and in the Non-Math group is Greek. The largest number of different languages are spoken by the Math-Male subgroup. Only three languages: French, Russian, and Jewish -- are represented in Math-Female subgroup, which also has the smallest number of families speaking a foreign language than any of the subgroups. The comparatively large number of Greek-speaking respondents are almost all from School IV, and for this reason, the foreign speaking families may be overrated or unbalanced as regards a general tendency. However, disregarding this class (Greek), does not change the general indications of foreign

TABLE XI

HOBBIES OF THE RESPONDENTS' FAMILIES

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Hobbies	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Reading	15	60.0	18	20.9	33	29.7	38	39.2	17	32.1	55	36.7
Sewing	11	44.0	28	32.5	39	35.1	60	61.9	16	30.2	76	50.7
Collecting	8	32.0	14	16.3	22	19.8	21	21.6	6	11.3	27	18.0
Sports	12	48.0	42	48.8	54	48.6	53	54.6	22	41.5	75	50.0
Cooking	3	12.0	9	11.3	12	10.8	6	6.2	2	3.8	8	5.3
Mechanics & Craft	5	20.0	17	19.8	22	19.8	29	29.9	8	15.1	37	24.7
Gardening	4	16.0	19	25.7	23	20.7	24	24.7	6	11.3	30	20.0
Social Clubs	1	4.0	9	11.3	10	18.9	8	8.2	1	1.9	9	6.0
Arts	11	44.0	22	25.6	33	29.7	23	23.7	10	18.9	33	22.0
Photography	1	4.0	9	11.3	10	18.9	4	4.1	3	5.7	7	4.7
Games	4	16.0	6	8.1	10	18.9	8	8.2	7	13.2	15	10.0
Movies	2	8.0	4	4.7	6	5.4	4	4.1	2	2.3	6	4.0
Radio	0	0.0	2	2.3	2	1.8	4	4.1	3	5.7	7	4.7
Dancing	0	0.0	4	4.7	4	3.6	10	10.3	4	7.5	14	9.3
Math	0	0.0	1	1.2	1	.9	0	0.0	0	0.0	0	0.0
Genealogy	0	0.0	1	1.2	1	.9	0	0.0	0	0.0	0	0.0
Current Events	1	4.0	1	1.2	2	1.8	2	2.1	0	0.0	2	1.3
Nature	0	0.0	1	1.2	1	.9	5	5.2	0	0.0	5	3.3
Traveling	2	8.0	1	1.2	3	2.7	2	2.1	1	1.9	3	2.0
Philanthropy	0.	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Hairdressing	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	0.7
Speaking	0	0.0	0	0.0	0	0.0	1	1.0	1	1.9	2	1.3
Astrology	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
None	2	8.0	15	20.3	17	15.3	9	9.3	10	18.9	19	12.7

TABLE XII

FOREIGN LANGUAGES SPOKEN IN THE RESPONDENTS' HOMES

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Language	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Russian	1	4.0	1	1.3	2	1.8	0	0.0	0	0.0	0	0.0
French	1	4.0	1	1.3	2	1.8	3	3.1	2	3.8	5	3.3
Jewish	1	4.0	7	8.2	8	7.2	0	0.0	0	0.0	0	0.0
German	0	0.0	2	2.3	2	1.8	0	0.0	0	0.0	0	0.0
Polish	0	0.0	3	3.5	3	2.7	0	0.0	0	0.0	0	0.0
Greek	0	0.0	3	3.5	3	2.7	8	8.3	7	13.2	15	10.0
Armenian	0	0.0	1	1.3	1	0.9	1	1.0	0	0.0	1	0.7
Italian	0	0.0	1	1.3	1	0.9	0	0.0	0	0.0	0	0.0
Portuguese	0	0.0	0	0.0	0	0.0	2	2.1	0	0.0	2	1.3
Turkish	0	0.0	0	0.0	0	0.0	0	0.0	1	1.9	1	0.7
Albanian	0	0.0	0	0.0	0	0.0	0	0.0	1	1.9	1	0.7
Not Named	0	0.0	1	1.3	1	0.9	0	0.0	0	0.0	0	0.0
Total	3	12.0	20	23.1	23	26.8	14	14.5	11	20.7	25	16.7

language influence in the Math group, although it brings down the influence in the Non-Math group considerably.

Question B-11 was included to discover overcrowded conditions which might affect the students' study opportunities. Conditions which necessitated more than two members of the family sharing one bedroom were considered overcrowded. One instance of overcrowding was found in the Math-Male group and three in the Non-Math-Female group.

Concerning the Scholastic Backgrounds of the Students

Tables XIII-A and XIII-B show the lowest marks the students received in years ten and eleven (Question C-1). Some of the students gave letter grades and some gave percentage grades. Percentage grades were transformed to letter grades by means of the following equivalences: A equal to 90-100 per cent, B equal to 80-89 per cent, C equal to 70-79 per cent, D equal to 60-69 per cent, and F equal to below 60 per cent.

Examination of these tables reveals that both the Math and Non-Math groups have their highest percentage of members in the 'C' class; while the Maths have more 'A's and 'B's and fewer 'D's and 'F's than the Non-Maths. The Math-Females, however, get mainly 'B's and no 'F's as lowest marks, with more 'A's and fewer 'D's than the other subgroups. In general, the Math-Females have the highest grades of all the groups.

Tables XIV-A and XIV-B show the mathematics grades obtained in years ten and eleven. For the Non-Math groups, these

TABLE XIII-A

RESPONDENTS' LOWEST GRADE IN YEAR TEN

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Grade	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	8	32.0	8	9.3	16	14.4	8	8.3	0	0.0	8	5.3
B	9	36.0	26	30.3	35	31.6	25	25.8	5	9.4	30	20.0
C	6	24.0	36	41.8	42	37.8	45	46.4	21	39.6	66	44.0
D	1	4.0	11	12.8	12	10.8	12	12.4	17	32.0	29	19.3
F	0	0.0	1	1.2	1	0.9	3	3.1	4	7.5	7	4.7
Not Given	1	4.0	4	4.7	5	4.5	4	4.1	6	11.3	10	6.7

TABLE XIII-B

RESPONDENTS' LOWEST GRADE IN YEAR ELEVEN

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Grade	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	4	16.0	7	8.2	11	9.9	6	6.2	0	0.0	6	4.0
B	15	60.0	25	29.0	40	36.0	35	36.1	4	7.5	39	26.0
C	4	16.0	42	48.8	46	41.5	38	39.2	21	39.6	59	39.4
D	1	4.0	7	8.2	8	7.2	11	11.3	15	28.3	26	17.3
F	0	0.0	1	1.2	1	0.9	3	3.1	4	7.5	7	4.7
Not Given	1	4.0	4	4.7	5	4.5	4	4.1	9	17.0	13	8.7

TABLE XIV-A

RESPONDENTS' MATHEMATICS GRADE IN YEAR TEN

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Grade	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	15	60.0	34	39.5	49	44.2	19	22.4	2	4.3	21	15.9
B	7	28.0	30	34.9	37	33.3	25	29.4	11	23.4	36	27.3
C	3	12.0	17	19.8	20	18.0	27	31.8	16	34.0	43	32.6
D	0	0.0	0	0.0	0	0.0	9	10.6	9	19.2	18	13.6
F	0	0.0	0	0.0	0	0.0	2	2.5	4	8.5	6	4.5
Not Given	0	0.0	5	5.8	5	4.5	3	3.5	5	10.6	8	6.1
Total	25	100.0	86	100.0	111	100.0	85	100.0	47	100.0	132	100.0
None	0	0.0	0	0.0	0	0.0	12	12.4	6	11.3	18	12.0

TABLE XIV-B

RESPONDENTS' MATHEMATICS GRADE IN YEAR ELEVEN

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Grade	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
A	13	52.0	27	31.4	40	36.0	9	21.4	3	8.1	12	15.2
B	9	36.0	30	34.9	39	35.2	17	40.5	8	21.6	25	31.6
C	2	8.0	20	23.3	22	19.8	10	23.8	13	35.1	23	29.2
D	0	0.0	3	3.4	3	2.7	4	9.5	4	10.8	8	10.1
F	0	0.0	0	0.0	0	0.0	1	2.4	2	5.4	3	3.8
Not Given	1	4.0	6	7.0	7	6.3	1	2.4	7	18.9	8	10.1
Total	25	100.0	86	100.0	111	100.0	42	100.0	37	100.0	79	100.0
None	0	0.0	0	0.0	0	0.0	55	56.7	16	30.2	71	47.3

percentages were necessarily based on the number within each subgroup who were taking mathematics, since many of these respondents took no mathematics in the tenth or eleventh years.

The Math group generally receives a grade of 'A' or 'B' in tenth and eleventh year mathematics. They never get lower than a 'C' in the tenth year and only 2.7 per cent get lower than a 'C' in the eleventh year. (4.5 per cent of the tenth year grades and 6.3 per cent of the eleventh year grades were not given, and the reason for this may be that these marks were low. However, they could not have been 'F's or the students would not be taking twelfth year mathematics now.) In both years, more Math-Females received 'A's than any of the other subgroups. (It is interesting to note that 22.4 per cent and 21.4 per cent of the Non-Math-Females received 'A' as their mathematics mark in years ten and eleven respectively, while the Non-Math Males had only 4.3 per cent and 8.1 per cent of their members in the 'A' class in the tenth and eleventh years respectively.

Tables XV-A and XV-B show (A) the amount of science taken prior to year twelve, (B) the incidence of one year of science in either year ten or eleven. Tables XV-A and XV-B are concerned with the science background of the students and reveal that approximately forty per cent of all the groups take one year of science prior to the twelfth year. More Math, and the Math-Males in particular, take two years of science prior to the twelfth year. More Non-Maths have no science in the tenth and eleventh year than do Maths. The Math-Females have less science

TABLE XV-A

AMOUNT OF SCIENCE TAKEN BY THE RESPONDENTS PRIOR TO YEAR TWELVE

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Years	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	10	40.0	37	43.0	47	42.4	41	42.3	24	45.3	65	43.4
2	8	32.0	38	44.2	34	30.6	9	9.3	3	5.7	12	8.0
0	7	28.0	11	12.8	18	16.2	47	48.4	26	49.0	47	31.4

TABLE XV-B

INCIDENCE OF ONE YEAR OF SCIENCE IN EITHER YEAR TEN OR ELEVEN

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Year	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
10	6	24	12	14.0	18	16.2	22	22.7	4	7.5	26	17.3
11	4	16	25	29.1	29	26.1	19	19.6	20	37.7	39	26.0

background the Math-Males, but more than the Non-Math Females or the Non-Math-Males.

Table XVI shows the number of foreign languages studied prior to year twelve.

The language background of the respondents reveals no appreciable difference between the Math and Non-Math groups. More Math-Females studied two languages than the members of any of the other subgroups. No Math-Females studied three languages, and the percentages for the other groups are very small. On the whole, Math-Females study more languages and Math-Males study fewer languages prior to year twelve than the Non-Math subgroups.

Table XVII shows the incidence prior to year twelve of subjects not usually included in the college preparatory course curriculum. The classifications used were: Commercial, Applied Science, Shop, Geography, Mechanical Drawing, and Home Economics, Applied Science includes aeronautics, navigation, power plants, and radio.

In general more Maths than Non-Maths take these courses, and commercial subjects are the most popular. However, the Math-Female subgroup has 16.0 per cent of its members taking Home Economics as compared to 2.1 per cent of the Non-Math Females.

Table XVIII-A shows the students' plans for his future (Question D-1). Table XVIII-B shows the choice of course in college of those students who checked college as their plan for the future. Table XVIII-C shows the vocational aim of the

TABLE XVI

NUMBER OF FOREIGN LANGUAGES STUDIED PRIOR TO YEAR TWELVE

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Number	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	0	0.0	8	9.3	8	7.2	3	3.1	9	17.0	12	8.0
1	5	20.0	35	40.7	40	36.0	36	37.1	16	30.2	52	34.7
2	20	80.0	40	46.5	60	54.0	54	55.6	27	50.9	81	54.0
3	0	0.0	3	3.5	3	2.7	4	4.1	1	1.9	5	3.3

TABLE XVII

INCIDENCE OF SUBJECTS NOT USUALLY INCLUDED IN THE COLLEGE COURSE

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Subject	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Commercial	1	4.0	8	9.3	9	8.1	29	29.9	8	15.1	37	24.7
Applied Science	0	0.0	1	1.2	1	0.9	2	2.1	3	5.7	5	3.3
Shop	0	0.0	4	4.7	4	3.6	0	0.0	3	5.7	3	2.0
Geography	0	0.0	0	0.0	0	0.0	3	3.1	1	1.9	4	2.7
Mechanical Drawing	0	0.0	4	4.7	4	3.6	0	0.0	1	1.9	1	0.7
Home Economics	4	16.0	0	0.0	4	3.6	2	2.1	0	0.0	2	1.3
Total	5	20.0	17	19.8	22	19.8	36	37.1	16	32.0	52	34.7

students (Question D-2). These answers were grouped to a limited extent. Science includes physics and chemistry only. Business includes one government worker in the Math-Female group; one "personnel manager," and one "textile business" man in the Math-Male group; one "textile executive" in the Non-Math-Male group; and four "mechandizing" and one "business manager" in the Non-Math-Female group. Education includes specifically, four teachers, one kindergarten, one elementary, one physical education, and one French teacher in the Non-Math-Female group, and one physical education teacher in the Non-Math-Male group.

Table XVIII-D shows these same vocations grouped as Mathematics, Pure and Applied Science, Nursing and Medicine, and Other. Pure and Applied Science included physics, chemistry, aviation, optometry, dietetics, laboratory technology, meteorology, and pharmacy.

Table XVIII-A reveals that 99.1 per cent of the Maths and 80.7 per cent of the Non-Maths still intend to go to college. Of the remaining 19.3 per cent of the Non-Maths, 5.3 per cent intend to work, 3.3 per cent expect to go into the armed forces, and the others are going to some type of school other than college.

Table XVIII-B shows that with the exception of Science or Engineering, and Education, the courses to be pursued by those going on to college are approximately equally represented by the Math and Non-Math groups. 28.9 per cent more of the Maths intend to major in Science or Engineering than of the Non-Maths,

TABLE XVIII-A

RESPONDENTS' FUTURE PLANS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
College	25	100.0	85	98.8	110	99.1	81	83.5	40	75.5	121	80.7
Business School	0	0.0	0	0.0	0	0.0	6	6.2	2	3.8	8	5.3
Vocational School	0	0.0	0	0.0	0	0.0	0	0.0	2	3.8	2	1.3
Working	0	0.0	1	1.2	1	0.9	4	4.1	4	7.5	8	5.3
Armed Forces	0	0.0	0	0.0	0	0.0	0	0.0	5	9.4	5	3.3
Nursing School	0	0.0	0	0.0	0	0.0	3	3.1	0	0.0	3	2.0
Hairdressing School	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	0.7
No Answer	0	0.0	0	0.0	0	0.0	2	2.1	0	0.0	2	1.3

TABLE XVIII-B

RESPONDENTS' CHOICE OF COURSE IN COLLEGE

Course	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Liberal Arts	11	44.0	10	11.9	22	19.8	15	15.5	7	13.2	22	14.7
Medical or Dental	4	16.0	13	15.1	17	15.3	14	14.4	10	18.9	24	16.0
Science or Engineering	3	12.0	35	40.7	38	34.2	4	4.1	4	7.5	8	5.3
Business	0	0.0	13	15.1	13	11.7	11	11.3	8	15.1	19	12.7
Education	3	12.0	3	3.5	6	5.4	18	18.6	1	1.9	19	12.7
Junior College	2	8.0	1	1.2	3	2.7	7	7.2	0	0.0	7	4.7
Law	1	4.0	0	0.0	1	0.9	0	0.0	0	0.0	0	0.0
Agriculture	0	0.0	1	1.2	1	0.9	0	0.0	2	3.8	2	1.3
Music and Art	0	0.0	0	0.0	0	0.0	0	0.0	1	1.9	1	0.7
Undecided	1	4.0	9	10.5	10	9.0	12	12.4	7	13.2	19	12.7

and 7.3 per cent more of the Non-Maths intend to major in education than the Maths. More Math-Females than any other group want to take a Liberal Arts course. This is the most popular course for the Math-Female subgroup. The majority of the Math-Males intend to take a science or engineering course, the majority of the Non-Math-Males intend to take a medicine or dentistry course.

Table XVIII-C shows the other occupations popular with the different groups. The Maths as a whole prefer engineering, medicine, law, and science, while the Non-Maths prefer nursing, secretarial work, and education. Education appeals equally to the two female subgroups (16.0 and 16.5 per cent) and to the two male subgroups (2.3 and 1.9 per cent), but approximately 14.0 per cent more females prefer this vocation.

The table of grouped vocations reveals that mathematical and scientific vocations appeal to the Maths while nursing or medical vocations appeal to the Non-Maths. The Math-Females prefer pure and applied science. The Math-Males have fewer members in the Nursing and Medicine class than any of the other subgroups. Language translating is also popular with the Math-Females, but not with the Non-Math-Females. Considering Math and Science vocations as using mathematics, 25.0 per cent of both the Math-Females and the Math-Males intend to use their mathematics. More Math-Females (20.0 per cent) are undecided as to their vocational aim than any of the other subgroups.

TABLE XVIII-C

RESPONDENTS' VOCATIONAL AIMS

Vocation	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Undecided	5	20.0	8	9.3	13	11.7	10	10.3	4	7.5	14	9.3
Education	4	16.0	2	2.3	6	5.4	16	16.5	1	1.9	17	11.3
Engineer	0	0.0	13	15.1	13	11.7	0	0.0	2	3.8	2	1.3
Medicine	2	8.0	6	7.0	8	7.2	0	0.0	7	13.2	7	4.7
Lawyer	1	4.0	4	4.7	5	4.5	0	0.0	0	0.0	0	0.0
Nurse	1	4.0	0	0.0	1	0.9	12	12.4	0	0.0	12	8.0
Secretary	0	0.0	0	0.0	0	0.0	12	12.4	0	0.0	12	8.0
Business	1	4.0	8	9.3	9	8.1	5	5.2	5	9.4	10	6.7
Accounting	0	0.0	3	3.5	3	2.7	1	1.0	2	3.8	3	2.0
Science	1	4.0	6	7.0	7	6.3	0	0.0	1	1.9	1	0.7
Salesman	0	0.0	1	1.2	1	0.9	0	0.0	2	3.8	2	1.3
Journalist	0	0.0	1	1.2	1	0.9	3	3.1	0	0.0	3	2.0
Farming	0	0.0	1	1.2	1	0.9	0	0.0	0	0.0	0	0.0
Forestry	0	0.0	1	1.2	1	0.9	0	0.0	1	1.9	1	0.7
Armed Forces	0	0.0	1	1.2	1	0.9	0	0.0	2	3.8	2	1.3
Meteorology	1	4.0	0	0.0	1	0.9	0	0.0	0	0.0	0	0.0
Lab Technician	1	4.0	0	0.0	1	0.9	4	4.1	0	0.0	4	2.7
Dietetics	1	4.0	0	0.0	1	0.9	1	1.0	0	0.0	1	0.7
Optometrist	1	4.0	0	0.0	1	0.9	0	0.0	0	0.0	0	0.0
Language Translating	2	8.0	0	0.0	2	1.8	1	1.0	0	0.0	1	0.7
Aviation	1	4.0	0	0.0	1	0.9	0	0.0	0	0.0	0	0.0
Music & Art	0	0.0	0	0.0	0	0.0	6	6.2	1	1.9	7	4.7
Pharmacist	0	0.0	0	0.0	0	0.0	1	1.0	1	1.9	2	1.3
Social Worker	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	0.7
Dental Assistant	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	0.7
Florist	0	0.0	0	0.0	0	0.0	0	0.0	1	1.9	1	0.7
Machinist	0	0.0	0	0.0	0	0.0	0	0.0	1	1.9	1	0.7
No Answer	3	12.0	31	36.0	33	29.7	23	23.7	29	41.5	45	30.0

TABLE XVIII-D

RESPONDENTS' VOCATIONAL AIMS

Vocation	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mathematics	0	0.0	16	18.6	16	14.4	1	1.0	4	7.5	5	3.3
Pure and Applied Science	6	24.0	6	7.0	12	10.8	6	6.2	2	3.8	8	5.3
Nursing and Medicine	3	12.0	6	7.0	9	8.1	13	13.4	7	13.2	20	13.3
Others	13	52.0	27	31.4	40	36.0	54	55.7	18	34.0	72	48.0

Concerning the Social and Interest Patterns of the Students

Tables XIX-A, B and C show the number of organizations to which the students belonged (A) in their school, (B) in their church, and (C) elsewhere; (Questions E-1a, E-1b, and E-1c). Table XIX-D reveals the nature of the organizations to which the students belonged in their schools. These were grouped wherever possible, but twenty different classifications were considered necessary.

There are only small differences in the affiliations of the different groups, with the exception that more Math-Females belonged to no church societies than any of the other subgroups.

The types of organizations to which the different groups belong do differ widely. The Maths belong to more Sports, Honor, Military, and Math associations, work on more publications, and are more active in student government than the Non-Maths. The Non-Math group prefers Dramatic, Language, Music, and social organizations. The Math-Females belong to more Sports, Language, Debating, Art, Folklore, and Math clubs, work on more publications, belong to more honor societies, and participate in school office work more than the Math-Males; while they belong to fewer Dramatic, Music, and Military organizations than the Non-Math-Females.

Table XX-A and Figures 5-A and 5-B show the number of different types of jobs held at some time by the students (Question E-2). Table XX-B shows the nature of these positions. Unskilled includes factory workers, laborers, pin boys, caddies,

TABLE XIX-A

ORGANIZATIONS TO WHICH RESPONDENTS BELONG AT SCHOOL

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Number	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	0	0.0	13	15.1	13	11.7	5	5.2	15	28.2	20	13.3
1	1	4.0	21	24.4	22	19.8	17	17.5	8	15.1	25	16.7
2	3	12.0	15	17.4	18	16.2	13	13.4	15	28.2	28	18.7
3	5	20.0	13	15.1	18	16.2	12	12.4	8	15.1	20	13.3
4	6	24.0	11	12.8	17	15.3	17	17.5	5	9.4	22	14.7
5	5	20.0	8	9.3	13	11.7	11	11.3	2	3.8	13	8.7
6	2	8.0	2	2.3	4	3.6	12	12.4	0	0.0	12	8.0
7	2	8.0	2	2.3	4	3.6	2	2.1	0	0.0	2	1.3
8	1	4.0	1	1.2	2	1.8	4	4.1	0	0.0	4	2.7
More	0	0.0	0	0.0	0	0.0	2	2.1	0	0.0	2	1.3
No Answer	0	0.0	0	0.0	0	0.0	2	2.1	0	0.0	2	1.3

TABLE XIX-B

ORGANIZATIONS TO WHICH RESPONDENTS BELONG AT CHURCH

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Number	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	18	72.0	49	57.1	67	60.4	37	38.2	32	60.4	69	46.0
1	7	28.0	30	35.0	37	33.3	37	38.2	12	22.6	49	32.6
2	0	0.0	4	4.7	4	3.6	17	17.5	6	11.3	23	15.3
3	0	0.0	2	2.3	2	1.8	3	3.1	3	5.7	6	4.0
4	0	0.0	1	1.2	1	0.9	0	0.0	0	0.0	0	0.0
5	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	0.7
No Answer	0	0.0	0	0.0	0	0.0	2	2.1	0	0.0	2	1.3

TABLE XIX-C

OTHER ORGANIZATIONS TO WHICH RESPONDENTS BELONG

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Number	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	15	60.0	41	47.8	56	50.5	60	65.0	35	66.0	95	63.4
1	9	36.0	30	35.0	39	35.2	27	27.8	8	15.1	35	23.3
2	1	4.0	9	10.5	10	9.0	7	7.2	5	9.4	12	8.0
3	0	0.0	4	4.7	4	3.6	0	0.0	4	7.5	4	2.7
4	0	0.0	2	2.3	2	1.8	0	0.0	1	1.9	1	0.7
5	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	0.7
No Answer	0	0.0	0	0.0	0	0.0	2	2.1	0	0.0	2	1.3

TABLE XIX-D

NATURE OF THE ORGANIZATIONS TO WHICH RESPONDENTS BELONG AT SCHOOL

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Organization	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Sports	24	96.0	29	33.8	53	47.8	29	29.9	20	37.8	49	32.7
Dramatics	2	8.0	10	11.6	12	10.8	14	14.4	10	18.9	24	16.0
Language	9	36.0	14	16.3	13	11.7	33	34.0	6	11.3	39	26.0
Music	2	8.0	8	9.3	10	18.9	31	32.0	12	22.6	42	28.0
Science	6	24.0	15	20.3	21	18.9	25	25.8	5	9.4	30	20.0
Publication	9	36.0	14	16.3	23	20.7	22	22.7	2	3.8	24	16.0
Honor	17	68.0	23	26.8	40	36.0	19	19.6	1	1.9	20	13.3
Social	3	12.0	9	11.3	12	10.8	18	18.5	7	13.2	25	16.7
Debating	4	16.0	2	2.3	6	5.4	6	6.2	1	1.9	7	4.7
Military School	1	4.0	7	8.1	8	72.0	33	34.0	9	17.0	42	28.0
Office Work	7	28.0	4	4.7	11	9.9	7	7.2	2	3.8	9	6.0
Student Government	1	4.0	14	16.3	15	13.5	9	9.3	3	5.7	12	8.0
Arts	2	8.0	0	0.0	2	1.8	4	4.1	1	1.9	5	3.3
Social Science	2	8.0	3	3.5	5	4.5	3	3.1	0	0.0	3	2.0
Photography	0	0.0	4	4.7	4	3.6	1	1.0	0	0.0	1	0.7
Stamp	0	0.0	0	0.0	0	0.0	0	0.0	1	1.9	1	0.7
Mathematics	6	24.0	8	9.3	14	12.6	0	0.0	0	0.0	0	0.0
Folklore	3	12.0	1	1.2	4	3.6	0	0.0	0	0.0	0	0.0
Religious	1	4.0	0	0.0	1	0.9	0	0.0	0	0.0	0	0.0
Chess	0	0.0	1	1.2	1	0.9	0	0.0	0	0.0	0	0.0

TABLE XX-A

NUMBER OF DIFFERENT TYPES OF JOBS HELD BY THE RESPONDENTS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Number	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	14	56.0	15	17.5	29	26.1	21	21.6	6	11.3	27	18.0
1	6	24.0	26	30.3	32	28.8	48	49.5	23	43.4	71	47.4
2	3	12.0	26	30.3	29	26.1	20	20.6	9	17.0	29	19.3
3	2	8.0	11	12.8	13	11.7	6	6.2	11	20.8	17	11.3
4	2	8.0	4	4.7	6	5.4	2	2.1	4	7.5	6	4.0
More	0	0.0	4	4.7	4	3.6	0	0.0	0	0.0	0	0.0

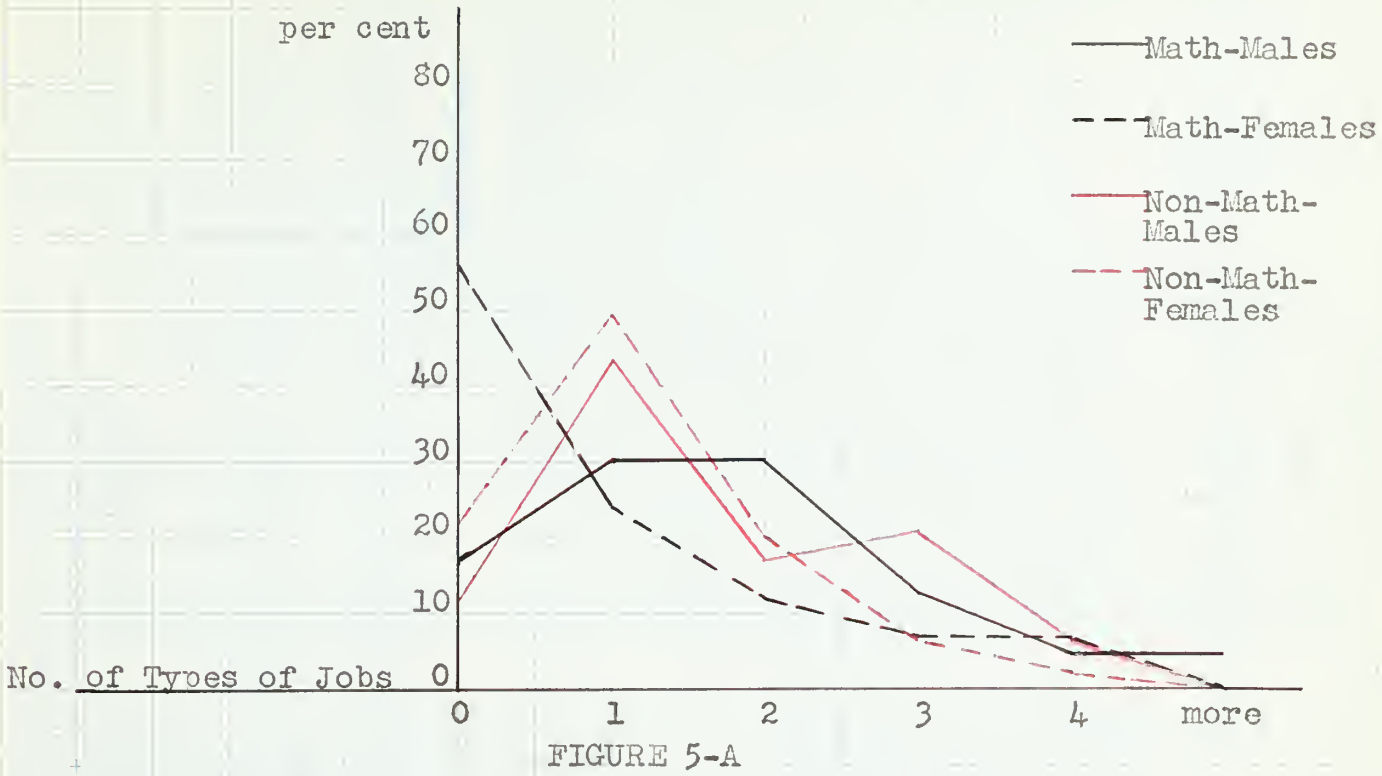


FIGURE 5-A

COMPARISON OF NUMBER OF TYPES OF JOBS HELD BY RESPONDENTS FOR ALL SUBGROUPS

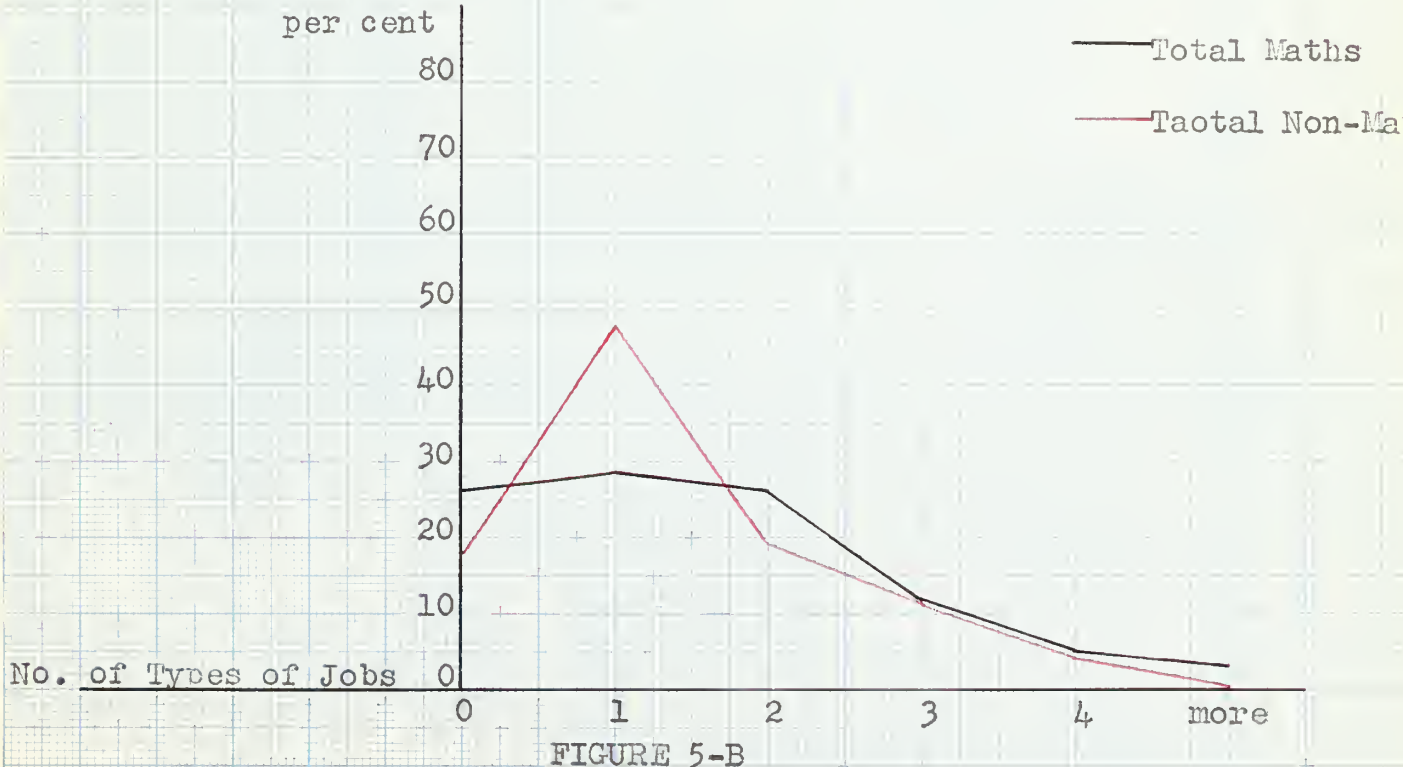


FIGURE 5-B

COMPARISON OF NUMBER OF TYPES OF JOBS HELD BY RESPONDENTS FOR THE TOTAL GROUPS

TABLE XX-B

NATURE OF THE JOBS HELD BY THE RESPONDENTS

Types of Jobs	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Clerk	3	12.0	29	33.8	32	28.8	45	46.4	25	47.2	70	46.7
Baby Sitter	2	8.0	0	0.0	2	1.8	20	20.6	0	0.0	20	13.3
Camp	3	12.0	13	15.1	16	14.4	7	7.2	4	7.5	11	7.3
Office	4	16.0	5	5.8	9	8.1	13	13.4	6	11.3	19	12.7
Restaurant	3	12.0	13	15.1	16	14.4	14	14.4	7	13.2	21	14.0
Unskilled	0	0.0	21	24.4	21	18.9	3	3.1	9	17.0	12	8.0
Arts	0	0.0	2	2.3	2	1.8	2	2.1	1	1.9	3	2.0
Hospital Aid	0	0.0	0	0.0	0	0.0	2	2.1	1	1.9	3	2.0
Housework	0	0.0	1	1.2	1	0.9	1	1.0	0	0.0	1	0.7
Gardener	0	0.0	13	15.1	13	11.7	0	0.0	16	30.2	16	10.7
Skilled	0	0.0	13	15.1	13	11.7	1	1.0	8	15.1	9	6.0
Tutoring	4	16.0	1	1.2	5	4.5	0	0.0	0	0.0	0	0.0
Laboratory Work	0	0.0	1	1.2	1	0.9	0	0.0	0	0.0	0	0.0

etc. Skilled includes machinists, mechanics, carpenters, blacksmiths, etc.

Many more of the Non-Maths than Maths had working experience at one type of job only. There is a slightly wider range of types of working experience in the Math group, with more equal distribution in the 0, 1, 2 classes than for the Non-Math group. Approximately 30-40 per cent more Math-Females than any other group had no working experience. Fewer Math-Females fell into the 1 and 2 classes, while more fell into the 4 class than the members of any other subgroup. The Non-Math-Females differ largely from the Math-Females in classes 0 and 1.

Tables XXI-A and XXI-B and Figures 6-A, 6-B, 6-C, and 6-D show the books read per month by the students during vacations and during school (Question F-1a), in two books per month intervals. One-quarter and one-half books per month were considered equal to zero, and when two numbers such as "2 or 3" were given, the highest one was recorded. Figures 2-A, 2-B, 3-C, and 2-D show these results graphically. Question F-1b was discarded since it falls into the opinion category rather than the background category.

During vacations, the two groups as a whole differ very little. However, the Math-Female group is shown to contain fewer members who read no books per month and more members who read 3-4 books per month than the other subgroups. During school the two groups differ in that the Maths have 12.0 per cent more in the 1-2 class and 7.0 per cent fewer in the 3-4 class

TABLE XXI-A

NUMBER OF BOOKS READ BY RESPONDENTS DURING VACATIONS

Books per Month	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	1	4.0	20	23.3	21	18.9	14	14.4	13	24.5	27	18.0
1-2	6	24.0	39	45.5	45	40.5	38	39.2	22	41.5	60	40.0
3-4	11	44.0	16	18.6	27	24.3	25	25.8	7	13.2	32	21.3
5-6	6	24.0	5	5.8	11	9.9	7	7.2	4	7.5	11	7.4
7-8	1	4.0	2	2.3	3	2.7	4	4.1	2	3.8	6	4.0
More	0	0.0	1	1.2	1	0.9	6	6.2	1	1.9	7	4.7
No Answer	0	0.0	3	3.5	3	2.7	3	3.1	4	7.5	7	4.7

TABLE XXI-B

NUMBER OF BOOKS READ BY RESPONDENTS DURING SCHOOL

Books per Month	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	0	0.0	20	23.3	20	18.0	19	19.6	14	26.4	33	22.0
1-2	20	80.0	45	52.5	65	58.5	45	46.4	24	45.2	69	46.0
3-4	2	8.0	10	11.7	12	10.8	19	19.6	7	13.2	26	17.3
5-6	3	12.0	5	5.8	8	7.2	5	5.2	3	5.7	8	5.3
7-8	0	0.0	1	1.2	1	0.9	1	1.0	0	0.0	1	0.7
More	0	0.0	2	2.3	2	1.8	5	5.2	1	1.9	6	4.0
No Answer	0	0.0	3	3.5	3	2.7	3	3.1	4	7.5	7	4.7

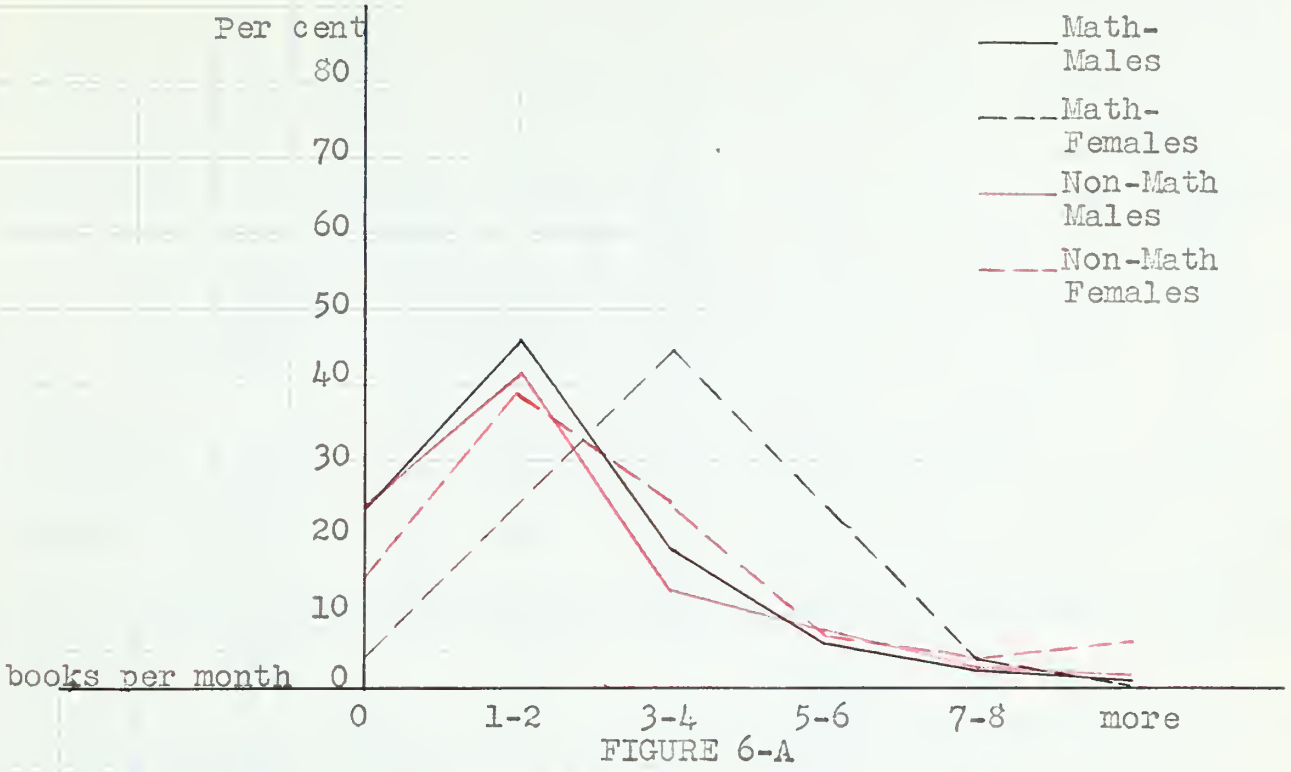


FIGURE 6-A

COMPARISON OF BOOKS READ DURING VACATIONS FOR ALL SUBGROUPS

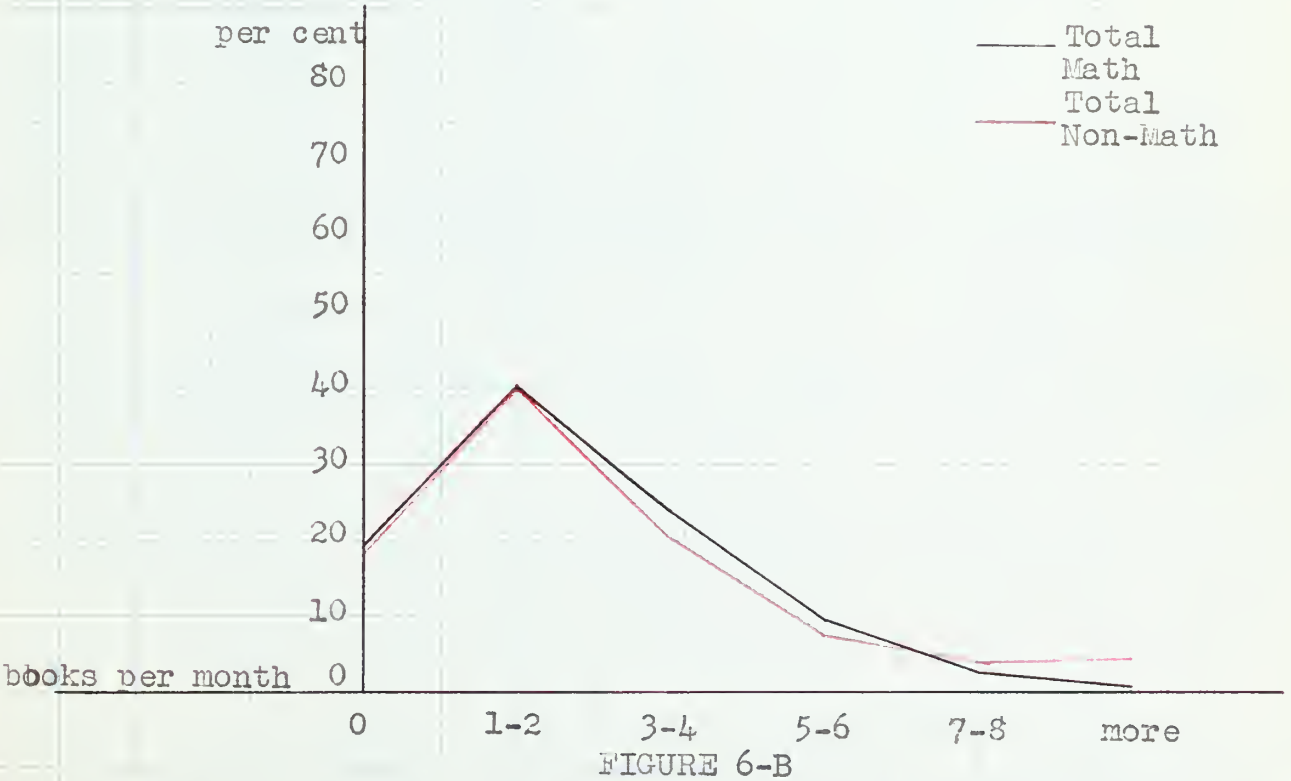


FIGURE 6-B

COMPARISON OF BOOKS READ DURING VACATIONS FOR THE TOTAL GROUPS

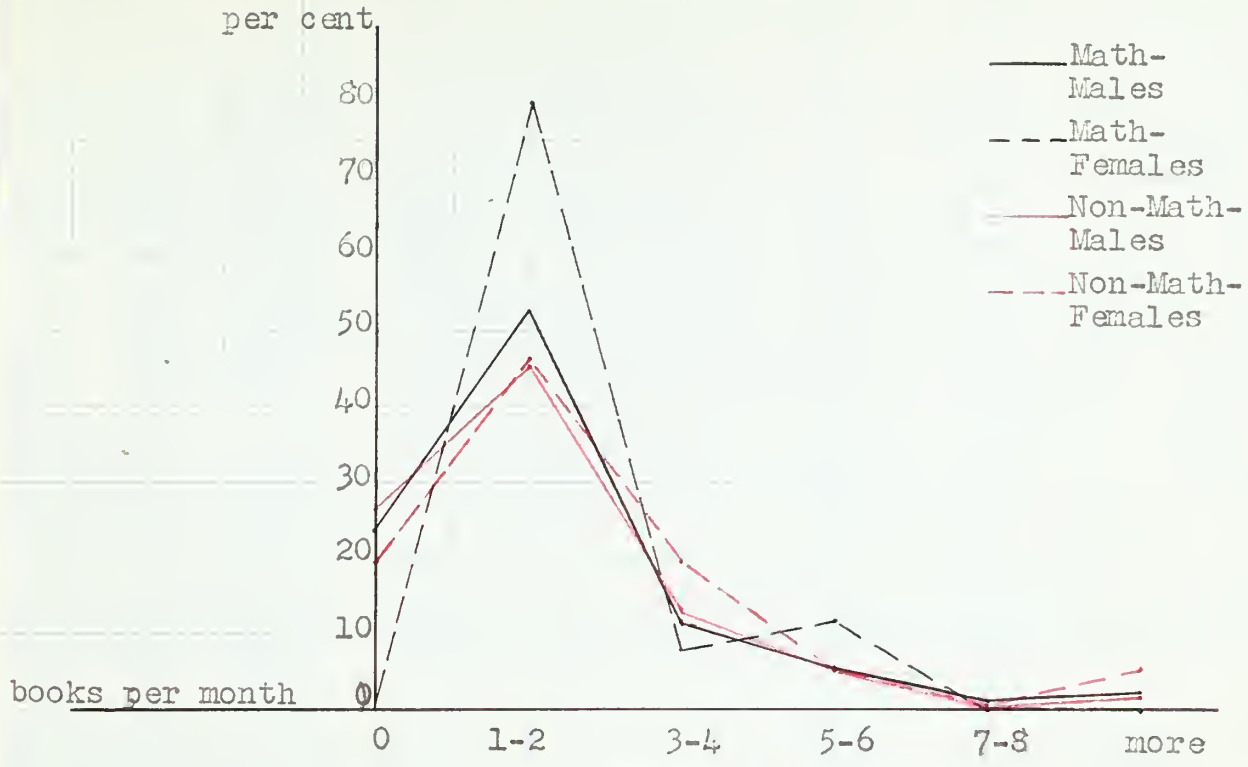


FIGURE 6-C

COMPARISON OF BOOKS READ DURING SCHOOL FOR ALL SUBGROUPS

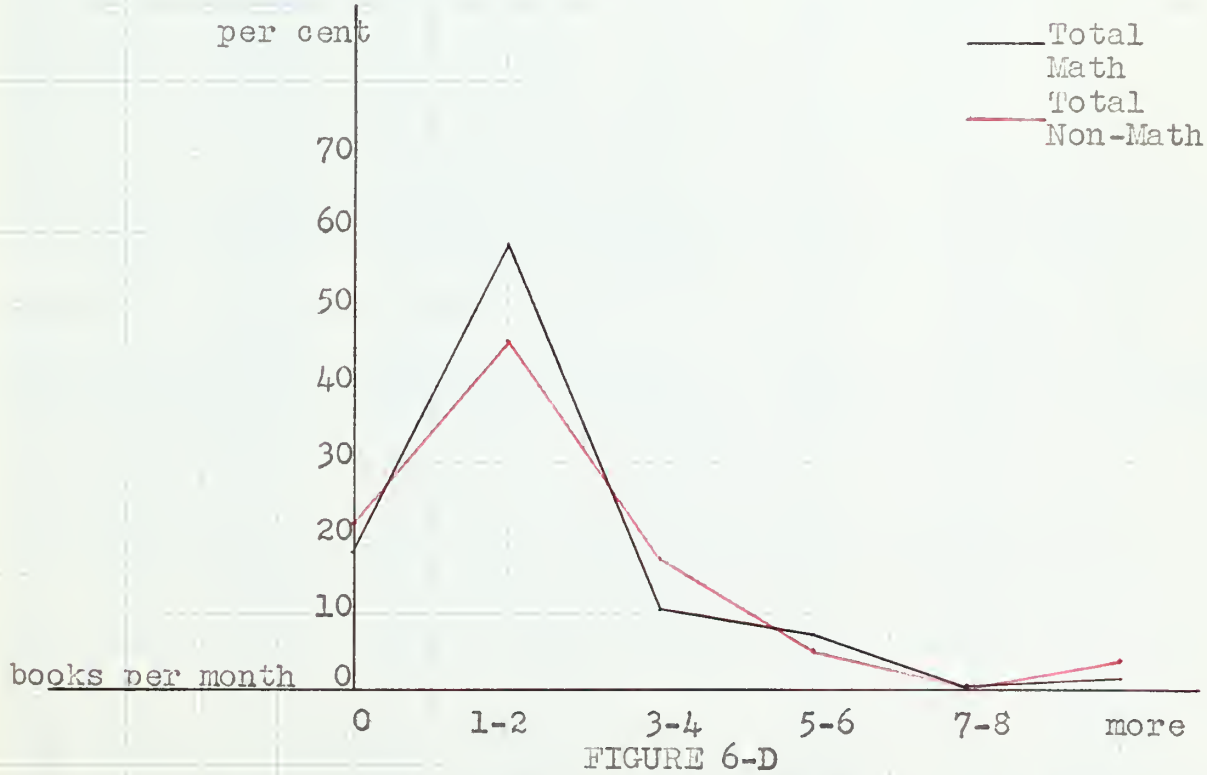


FIGURE 6-D

COMPARISON OF BOOKS READ DURING SCHOOL FOR THE TOTAL GROUPS

than the Non-Maths. The Math-Female subgroup is again different from the other subgroups having no members who read no books per month and more members who read 1-2 books per month.

Table XXII and Figures 7-A and 7-B show the number of times per month that the students go to parties or dances (Question F-2). ~~Figures 3-A and 3-B show these results graphically~~. Examination of the table and Figures reveals that 5.0 per cent more Maths go to no parties or dances per month than Non-Maths. The Math-Females have approximately 10.0 per cent more members in the 1-2 class than both the male subgroups and 32.0 per cent more than the Non-Math-Females. They have approximately 8.0 per cent fewer members in the 0 class than the Math-Males, and the same percentage as the Non-Math-Females. The Non-Math-Females differ from the other subgroups in their peak class only, which is 3-4 instead of 1-2.

Table XXIII shows the hobbies of the students (Question F-3). The classifications were kept the same as those in table XI whenever possible. Languages, Social Work, Magic, and Museums were added. When one student had more than one hobby falling under the same classification, only one point was added.

The Math group has more members in the classes: Collecting, Crafts, Gardening, Science, Photography, and None; and fewer members in the classes: Sewing, Games, and Dancing than the Non-Math group. While the Math-Males follow the Math group as a whole, the Math-Females follow them only in Photography, Collecting, Gardening, and Science. In addition, they (Math-

TABLE XXII

NUMBER OF TIMES PER MONTH RESPONDENTS GO TO DANCES OR PARTIES

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Times per Month	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0	1	4.0	10	11.7	11	9.9	4	4.1	4	7.5	8	5.3
1-2	13	52.0	34	39.6	47	42.4	20	20.6	23	43.4	43	28.7
3-4	8	32.0	26	30.3	34	30.6	39	40.2	15	28.2	54	36.0
5-6	0	0.0	10	11.7	10	9.0	18	18.6	4	7.5	22	14.7
7-8	1	4.0	1	1.2	2	1.8	2	2.1	2	3.8	4	2.7
9-10	1	4.0	0	0.0	1	0.9	1	1.0	1	1.9	2	1.3
More	0	0.0	0	0.0	0	0.0	3	3.1	1	1.9	4	2.7
No Answer	1	4.0	5	5.8	6	5.4	10	10.3	3	5.7	13	8.7

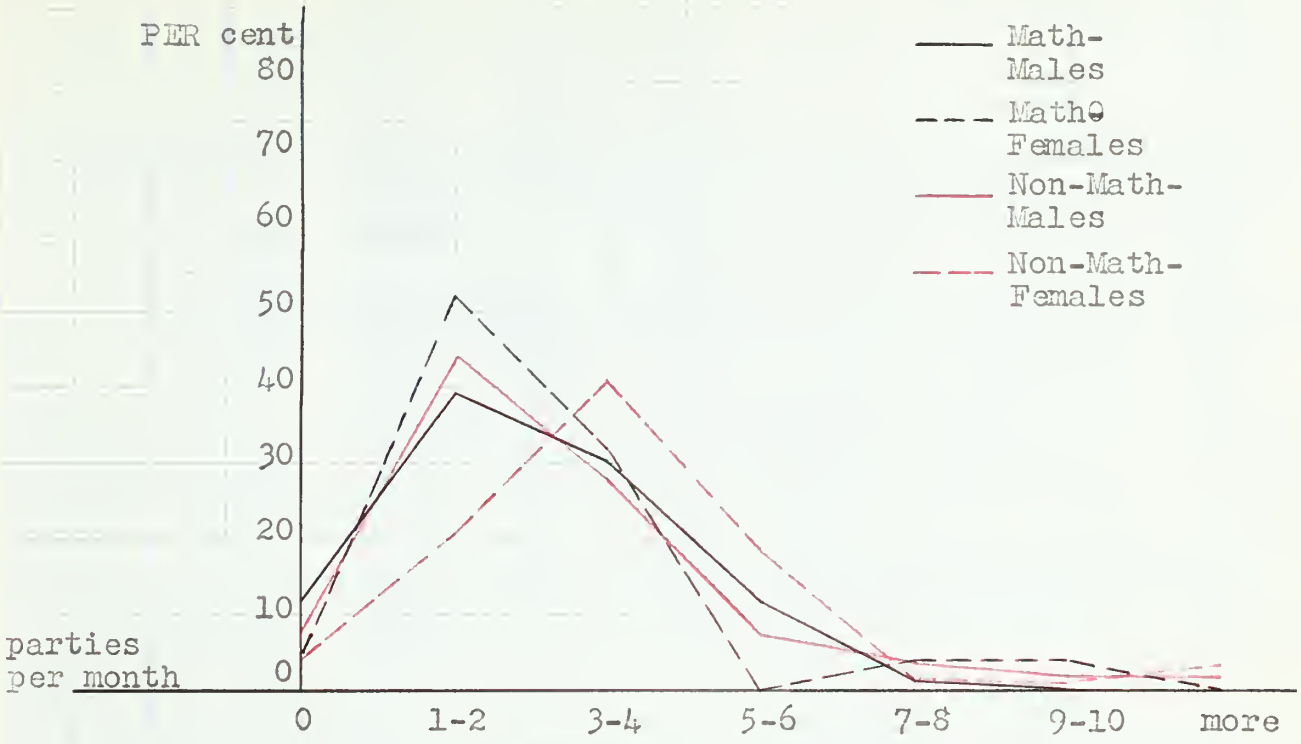


Figure 7-A

COMPARISON OF NUMBERS OF PARTIES OR DANCES ATTENDED FOR ALL SUBGROUPS

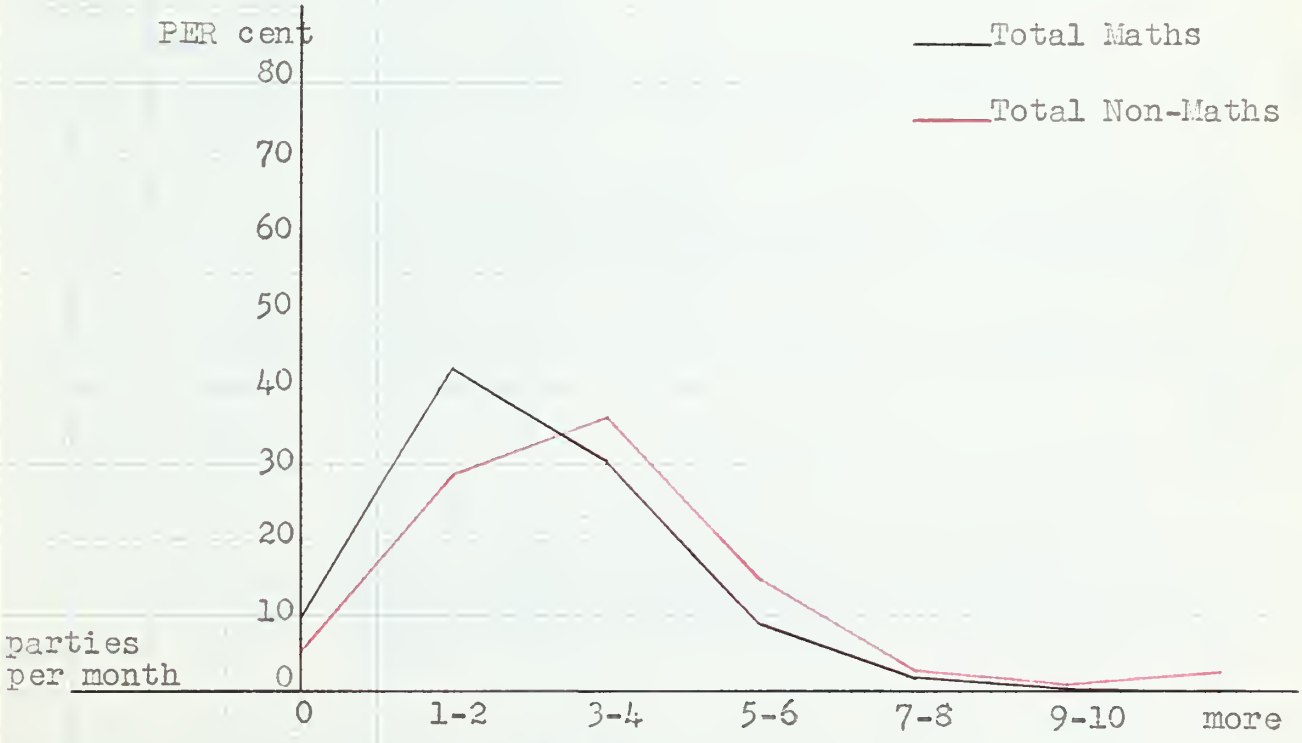


FIGURE 7-B

COMPARISON OF NUMBERS OF PARTIES OR DANCES ATTENDED FOR THE TOTAL GROUPS

TABLE XXIII

HOBBIES OF THE RESPONDENTS

Hobbies	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Reading	11	44.0	10	11.6	21	18.9	28	28.8	10	18.9	38	25.3
Sewing	7	21.0	0	0.0	7	6.3	34	35.0	0	0.0	34	22.7
Collecting	18	72.0	51	58.3	69	62.2	42	43.3	25	47.2	67	44.7
Sports	9	36.0	47	54.6	56	50.5	54	55.6	31	58.5	85	56.7
Cooking	2	8.0	0	0.0	2	1.8	3	3.1	1	1.9	4	2.7
Crafts	1	4.0	37	43.0	38	34.2	3	3.1	19	35.8	22	14.7
Gardening	2	8.0	6	8.1	8	7.2	2	2.1	0	0.0	2	1.3
Social	1	4.0	2	2.3	3	2.7	3	3.1	3	5.7	6	4.0
Arts	19	76.0	21	24.4	40	36.0	37	38.2	8	15.1	45	30.0
Photography	3	12.0	16	18.6	19	17.1	3	3.1	6	11.3	9	6.0
Games	0	0.0	2	2.3	2	1.8	2	2.1	7	13.2	9	6.0
Movies	0	0.0	2	2.3	2	1.8	2	2.1	0	0.0	2	1.3
Radio	0	0.0	5	5.8	5	4.5	1	1.0	1	1.9	2	1.3
Dancing	5	20.0	4	4.7	9	8.1	25	25.8	12	22.6	37	24.7
Math	0	0.0	1	1.2	1	0.9	0	0.0	0	0.0	0	0.0
Science	0	0.0	9	11.3	9	8.1	0	0.0	2	3.8	2	1.3
Politics	0	0.0	1	1.2	1	0.9	1	1.0	0	0.0	1	0.7
Nature	1	4.0	4	4.7	5	4.5	3	3.1	2	3.8	5	3.3
Traveling	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	0.7
Dramatics	0	0.0	0	0.0	0	0.0	4	4.1	0	0.0	4	2.7
Debating	1	4.0	0	0.0	1	0.9	2	2.1	0	0.0	2	1.3
Languages	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	0.7
Social Work	0	0.0	0	0.0	0	0.0	2	2.1	0	0.0	2	1.3
Magic	0	0.0	3	3.5	3	2.7	0	0.0	0	0.0	0	0.0
Museums	0	0.0	1	1.2	1	0.9	0	0.0	0	0.0	0	0.0
None	1	4.0	9	11.3	10	18.9	9	9.3	7	13.2	16	10.7

Females) have a large number of members in the classes: Reading, Arts, Sewing, and Dancing, and only 4.0 per cent in None. However, this subgroup exhibits a slightly narrower range. The Non-Math-Females generally follow the Non-Math group. Neither of the male subgroups show any interest in Sewing, Traveling, Dramatics, Debating, Languages, or Social Work.

Table XXIV shows the subjects on which the students spent the most time (Question F-4). These subjects were classified as Mathematics, Science, Social Studies, English, Language, Commercial, Music-Art, and Applied Science. Some of the students put down two subjects which fell under the same classification: such as physics and chemistry. In such cases only one point was given. Social Studies included history and economics; Science included physics, chemistry, and biology. However, biology was mentioned by only one Math-Male.

This table reveals that the Math students spend the most time on Mathematics, and the Non-Maths the most time on English. Science and Social Studies are in the second and third places respectively for both groups. The subgroups follow the main groups. Both female subgroups have Languages in the fourth place; while the Math Males have English, and the Non-Math-Males, Mathematics in the fourth place. Ten per cent of the Non-Maths also spend time on commercial subjects, compared to 1.8 per cent of the Maths who do so. (Some reason for this may be seen in the results of table XVII, showing that approximately 16.0 per cent more Non-Maths than Maths take commercial subjects

TABLE XXIV

SUBJECTS ON WHICH RESPONDENTS SPEND THE MOST TIME

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Subject	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mathematics	20	80.0	46	53.5	66	59.5	8	8.2	13	24.5	21	14.0
Science	9	36.0	45	52.4	54	48.7	43	44.4	21	39.6	64	42.7
Social Studies	9	36.0	30	34.9	39	35.2	23	23.7	20	37.8	43	28.7
English	4	16.0	20	23.0	24	21.6	69	71.1	28	52.8	97	64.7
Languages	6	24.0	9	10.4	15	13.5	22	22.7	5	9.4	27	18.0
Commercial	0	0.0	2	2.3	2	1.8	11	11.3	4	7.5	15	10.0
Music and Art	0	0.0	0	0.0	0	0.0	1	1.0	1	1.9	2	1.3
Applied Science	0	0.0	1	1.2	1	0.9	0	0.0	4	7.5	4	2.7
No Answer	0	0.0	8	9.3	8	7.2	3	3.1	3	5.7	6	4.0

TABLE XXV

MANNER IN WHICH RESPONDENTS SPEND THEIR VACATIONS

	MATH						NON-MATH					
	Female		Male		Total		Female		Male		Total	
Manner	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Working	6	24.0	68	79.1	74	66.6	52	53.6	40	75.5	92	61.3
Traveling	4	16.0	6	8.1	10	9.0	11	11.3	8	15.1	19	12.7
Summer Camp	11	44.0	11	12.8	22	19.8	16	16.5	6	11.3	22	14.7
At Home	12	48.0	18	20.9	30	27.0	31	32.0	8	15.1	39	26.0
Summer Resort	2	8.0	4	4.7	6	5.4	3	3.1	1	1.9	4	2.7
Summer Home	2	8.0	1	1.2	3	2.7	2	2.1	0	0.0	2	1.3
Home Study	2	8.0	1	1.2	3	2.7	0	0.0	1	1.9	1	0.7
No Answer	0	0.0	0	0.0	0	0.0	3	3.1	0	0.0	3	2.0

prior to year twelve.

Table XXV shows the manner in which the students generally spend their summer vacations (Question F-5). Classifications added by the pupils were School, Summer Resort, Country Home, and Home Study. The respondents were permitted to check more than one answer to this question. One point was given for each answer checked in each classification.

The two main groups differ only slightly, with all the subgroups except the Math-Females, following the same pattern. The Math-Females are shown to spend more vacations at Home and at Summer Camps, and fewer vacations working than any of the other groups. They also have slightly higher percentages in the remaining classes.

Summary

The background divisions used in this study can be listed as follows:

1. Student's age
2. Marital status of student's parents
3. Student's parents' ages
4. Student's parents' occupations
5. Student's parents' education
6. Number of siblings the student has
7. Ages of the student's siblings
8. Occupations of the student's siblings
9. Hobbies of other members of the student's family

10. Foreign languages spoken in the student's home
11. Crowding of living conditions in the student's home
12. Student's school marks
13. Student's school program
14. Student's affiliation with organized groups
15. Student's working experience
16. Student's reading activity
17. Student's social activity
18. Student's hobbies
19. Student's manner of spending vacations
20. School subjects student spends most time on

Certain of these divisions possessed factors which were present in greater strength in some groups than in others. The following tables present summaries showing the distinguishing factors for three pairs of groups; the Maths versus the Non-Maths, the Math-Females versus the Non-Math-Females, and the Math-Males versus the Math-Females. These tables are divided into four sections. The first section lists the factors involved; the second, the percentage of the total members who have this factor; the third, the difference of the percentages of the two groups; and fourth, the ratio of the percentages of the two groups.

Table XXVI shows the factors which are present in greater strength in the Math group than in the Non-Math group.

TABLE XXVI

MATH VS. NON-MATH

Factor	Percentage	Percentage Difference	Percentage Ratio
1. Jewish religious faith	14.4	8.0	2.4
2. Father employed in mathematics field	11.7	4.4	1.6
3. Father employed in science field	6.3	5.0	4.9
4. Father a professional worker	27.9	14.6	2.1
5. Father owns (or partly owns) his own business	38.7	38.7	1.7
6. Father has college education	38.7	14.7	1.6
7. Father has education beyond college	8.1	8.1	∞
8. Mother has college education	28.2	8.9	1.5
9. Father majored in mathematics in college	4.6	4.6	∞
10. Father majored in engineering at college	12.7	6.7	2.1
11. Mother majored in education at college	5.4	4.1	4.2
12. Mother majored in science or mathematics at college	4.5	3.8	6.4
13. No brothers	40.5	10.5	1.4
14. Has been exposed to the hobby classes:			
a) cooking	10.8	5.5	2.0
b) games	18.9	8.9	1.9
c) social	18.9	12.9	3.2
d) photography	18.9	14.2	4.0
15. Foreign language spoken at home	26.8	10.1	1.6
16. Jewish is spoken at home	7.2	7.2	∞
17. Lowest mark in year ten is 'A'	14.4	9.1	2.7

TABLE XXVI (Cont'd)

Factor	Percentage	Percentage Difference	Percentage Ratio
18. Lowest mark in year ten is 'B'	31.6	11.6	1.6
19. Lowest mark in year eleven is 'A'	9.9	5.9	2.5
20. Lowest mark in year eleven is 'B'	36.0	10.0	1.4
21. Mathematics mark in year ten is 'A'	44.2	28.3	2.8
22. Mathematics mark in year eleven is 'A'	36.0	20.8	2.4
23. Two years of science studied prior to year twelve	30.6	22.6	3.9
24. Belongs to following types of groups at school:			
a) sports	47.8	15.1	1.5
b) military	72.0	44.0	2.6
c) mathematics	12.6	12.6	∞
d) publications	20.7	4.7	1.3
e) student government	18.5	5.5	1.7
f) honor societies	36.0	22.7	2.7
25. No working experience	26.1	8.1	1.4
26. Reads 1-2 books per month during school	58.5	8.5	1.3
27. Goes to no parties or dances per month	9.9	4.6	1.8
28. Goes to 1-2 parties or dances per month	42.4	13.7	1.5
29. Has no hobbies	18.9	8.2	1.8
30. Has hobbies in the following classes:			
a) collecting	62.2	17.5	1.4
b) crafts	34.2	19.5	2.3
c) gardening	7.2	5.9	5.5
d) science	8.1	1.3	6.2
e) photography	17.1	11.1	2.9
31. Spends more time on mathematics than on any other subject	59.5	45.5	4.3

The following factors do not distinguish either group.

1. Mothers' and fathers' ages
2. Mothers' occupations -- or whether they work at all
3. Siblings' ages
4. Sisters' occupations
5. Languages studied prior to year twelve
6. Number of organized groups to which the students belong
7. Number of books read per month during vacations
8. Method of spending summer vacations

Table XXVII shows the factors which are present in greater strength in the Math-Female subgroup than in the Non-Math-Female subgroup. The factors marked with an asterisk are common to the entire Math group.

TABLE XXVII

MATH-FEMALES VS. NON-MATH-FEMALES

Factor	Percentage	Percentage Difference	Percentage Ratio
*1. Father employed in mathematics field	20.0	11.8	2.4
*2. Father employed in science field	16.0	15.0	16.0
3. Father employed in law field	8.0	4.9	2.5
*4. Father is a professional worker	48.0	33.6	3.3
*5. Father owns (or partly owns) his own business	40.0	15.2	1.6
6. Mother works	36.0	16.3	1.8
7. Mother is employed in science	8.0	8.0	∞
*8. Father has college education	64.0	38.2	2.5

TABLE XXVII (Cont'd)

Factor	Percentage	Percentage Difference	Percentage Ratio
*9. Father has education beyond college	20.0	20.0	∞
*10. Mother has college education	36.0	14.4	1.7
11. Mother has education beyond college	8.0	8.0	∞
*12. Father majored in mathematics at college	12.0	12.0	∞
*13. Father majored in science at college	16.0	11.9	3.9
*14. Father majored in engineering at college	12.0	4.8	1.7
*15. Mother majored in education at college	8.0	7.0	8.0
*16. Mother majored in science at college	8.0	8.0	∞
*17. Mother majored in social studies at college	8.0	5.9	3.8
*18. No brothers	56.0	29.2	2.1
*19. No sisters	60.0	16.7	1.4
20. Is the only child	28.0	20.8	3.9
21. Any brothers are college students	16.0	5.7	1.6
22. Has been exposed to the hobby classes:			
a) reading	60.0	20.8	1.5
*b) collecting	32.0	10.4	1.5
c) cooking	12.0	5.8	1.9
d) arts	44.0	20.3	1.9
e) games	16.0	7.8	2.0
f) traveling	8.0	5.9	3.8
*23. Lowest mark in year ten is 'A'	32.0	23.7	3.9
*24. Lowest mark in year eleven is 'A'	16.0	11.8	2.6
*25. Lowest mark in year eleven is 'B'	60.0	23.9	1.7
*26. Mathematics mark in year ten is 'A'	60.0	37.6	2.7
*27. Mathematics mark in year eleven is 'A'	52.0	30.6	2.4

TABLE XXVII (Cont'd)

Factor	Percentage	Percentage Difference	Percentage Ratio
*28. Two years of science studied prior to year twelve	32.0	22.7	3.4
29. Two languages studied prior to year twelve	80.0	24.4	1.4
30. Home economics studied prior to year twelve	16.0	13.9	7.6
31. Belongs to following types of groups at school:			
*a) sports	96.0	66.1	3.2
*b) publications	36.0	13.3	1.6
*c) honor	68.0	48.4	3.5
d) debating	16.0	9.8	2.6
e) school office help	28.0	20.8	3.9
*f) mathematics	24.0	24.0	∞
*g) folklore	12.0	12.0	∞
*32. No working experience	56.0	34.4	2.6
33. Working experience tutoring	16.0	16.0	∞
34. Reads 3-4 books per month during vacations	44.0	18.2	1.7
*35. Reads 1-2 books per month during school	80.0	34.6	1.7
36. Goes to 1-2 parties per month	52.0	9.7	1.2
37. Has hobbies in the following classes:			
*a) collecting	72.0	28.7	1.7
*b) gardening	8.0	5.9	3.8
c) arts	76.0	37.8	2.0
d) reading	44.0	15.2	1.5
e) photography	12.0	8.9	3.9
*38. Spends more time on mathematics than on any other subject	80.0	71.8	9.8
39. Spends vacations at a summer camp	44.0	27.5	2.7
40. Spends vacations at home	48.0	16.0	1.5

Table XXVIII shows a comparison of the degree to which the same factors are possessed by the Math-Males and the Math-Females.

TABLE XXVIII

MATH MALES VS. MATH FEMALES

Factor	Percentage	Percentage Difference	Percentage Ratio
1. Fewer fathers employed in mathematics field	9.3	-10.7	0.5
2. Fewer fathers employed in science field	3.5	-12.5	0.2
3. Fewer fathers professional workers	25.7	-22.3	0.5
4. Fewer mothers employed in science	0.0	-8.0	0
5. Fewer fathers have college educations	31.4	-32.6	0.5
6. Fewer fathers have educations beyond college	4.7	-15.3	0.2
7. Fewer mothers have college educations	25.6	-10.4	0.7
8. Fewer mothers have educations beyond college	0.0	-8.0	0
9. Fewer fathers majored in science at college	2.3	-13.7	0.1
10. Fewer fathers majored in mathematics at college	2.3	-9.7	0.2
11. Fewer fathers majored in law at college	2.3	-5.7	0.3
12. Fewer mothers majored in education at college	4.7	-3.3	0.6
13. Fewer mothers majored in science at college	1.2	-6.8	0.2
14. Fewer mothers majored in social studies at college	2.3	-5.7	0.3

TABLE XXVIII (Cont'd)

Factor	Percentage	Percentage Difference	Percentage Ratio
15. Fewer males with no brothers	28.1	-27.9	0.5
16. Fewer males with no sisters	39.5	-20.5	0.7
17. More males with 3 siblings	27.9	19.9	3.5
18. More males with 4 siblings	20.9	12.9	2.6
19. Fewer brothers who are college students	4.8	-11.2	0.3
20. More sisters working as unskilled workers	9.3	9.3	∞
21. Less exposure to hobby classes:			
a) reading	20.9	-39.1	0.5
b) collecting	16.3	-15.7	0.5
c) arts	25.6	-18.4	0.6
d) games	8.1	-7.9	0.5
e) traveling	1.2	-6.8	0.2
22. More exposure to hobby classes:			
a) gardening	25.7	9.7	1.6
b) social	11.3	7.3	2.8
c) photography	11.3	7.3	2.8
23. Foreign language spoken at home	23.1	11.1	1.9
24. Fewer 'A's for lowest mark in year ten	9.3	-22.7	0.3
25. More 'C's for lowest mark in year ten	41.8	17.8	1.7
26. Fewer 'A's for lowest mark in year eleven	8.2	-7.8	0.5
27. More 'C's for lowest mark in year eleven	48.8	32.8	3.1
28. Fewer 'A's for mathematics mark in year ten	39.5	-20.5	0.7
29. More 'C's for mathematics mark in year ten	19.8	7.8	1.6
30. Fewer 'A's for mathematics mark in year eleven	31.4	-20.6	0.6

TABLE XXVIII (Cont'd)

Factor	Percentage	Percentage Difference	Percentage Ratio
31. More 'C's for mathematics mark in year eleven	23.3	19.3	2.9
32. More males studied two years of science prior to year twelve	44.2	12.2	1.3
33. Fewer males studied two languages prior to year twelve	46.5	-33.5	0.6
34. More males studied no languages prior to year twelve	9.3	9.3	∞
35. More males belong to no organizations at school	15.1	15.1	∞
36. More males belong to just one organization at school	24.4	20.4	6.1
37. Fewer males belong to the following types of organizations:			
a) sports	33.8	-62.2	0.4
b) publications	16.3	-19.7	0.5
c) honor	26.8	-41.2	0.4
d) debating	2.3	-13.7	0.1
e) mathematics	9.3	-14.7	0.4
f) school office work	4.7	-23.3	0.2
38. More males are active in student government	16.3	12.3	4.1
39. More males read no books during vacations	23.3	19.3	5.8
40. Fewer males read 3-4 books per month during vacations	18.6	-25.4	0.4
41. More males read no books during school	23.3	23.3	∞
42. Fewer males read 1-2 books during school	52.5	-27.5	0.7
43. More males go to no parties or dances per month	11.6	7.6	2.9
44. Fewer males have no working experience	17.5	-38.5	0.3

TABLE XXVIII (Cont'd)

Factor	Percentage	Percentage Difference	Percentage Ratio
45. More males have worked as:			
a) clerks	33.8	11.8	2.8
b) unskilled	24.4	24.4	∞
c) gardener	15.1	15.1	∞
d) skilled	15.1	15.1	∞
46. Fewer males have hobbies in the following classes:			
a) reading	11.6	-32.4	0.3
b) collecting	58.3	-13.7	0.8
c) arts	24.4	-51.6	0.3
47. More males have hobbies in the following classes:			
a) sports	54.6	18.6	1.5
b) crafts	43.0	39.0	10.7
c) photography	18.6	6.6	1.6
48. Fewer spend more time on mathematics than on any other subject	53.5	-26.5	0.7
49. More spend more time on science than on any other subject	52.4	16.4	1.5
50. More males spend their vacations working	79.1	55.1	3.3
51. Fewer males spend their vacations at a summer camp	12.8	-31.2	0.3
52. Fewer males spend their vacations at home	20.9	-27.1	0.4

Evaluation of the Survey

Table I-C (page 29) shows 111 Math and 150 Non-Math participants. Although these figures are in the ratio of 1 to 1.35, they are close enough to consider the Math group as adequately represented. The subgroups are not as well balanced. There are 25 Math-Females to 97 Non-Math-Females, and 86 Math-Males to 53 Non-Math-Males. Therefore, comparisons of the total Math and Non-Math groups are more significant than comparisons of the subtotals.

In tables XXVI and XXVII, the items with the highest percentage, the highest percentage difference, and the highest percentage ratio are the most significant. However, items where the percentage membership for one group is below 10 per cent, and the percentage membership for the other group is zero or close to zero, are indicative, and can be considered significant, because this means that 100 per cent or almost 100 percent of all the members of this particular class are in this one group, making this item characteristic of that group alone.

CHAPTER IV

CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

In view of the general evidence (chapter I) indicating more natural interest in science by the boys, and languages by the girls; greater difficulty with languages by the boys, and mathematics and science by the girls; a downward trend in the study of mathematics; and the small number of women in the mathematics field; two questions are presented:

1. Why do the few girls who elect mathematics, do so?

2. What general characteristics differentiate the students who have elected mathematics from those who have not?

Purpose of This Study

This study proposed to investigate the factors in the students' backgrounds which distinguished the students who elected mathematics from those who did not, in an effort to contribute some information towards the answers to the above questions, in the form of factors associated with students who elect mathematics. These distinguishing factors would cover two categories: the general characteristics of mathematics students, and the general background of activities

and interests which these students have and to which they are exposed at home and at school. (This study did not attempt to separate these two types of factors.)

The general characteristics represent effects; that is, the students possess them as a result of studying mathematics, whereas, the general background of activities and interests represents possible causes. Items such as the amount of reading the students do, cannot be distinguished here, as preceding or following the students' interests or activities in mathematics, or as a psychological factor not directly connected with mathematics. But wherever their origins are, they are associated with the students who elect mathematics.

These distinguishing factors could be responsible for part (or all) of the students' interests or abilities in mathematics, and could be sufficiently influential to cause the students to elect mathematics; although other influences outside the consideration of this thesis (such as heredity or hero worship) could be partially or completely responsible for this election of mathematics.

Procedure

To this end a questionnaire was constructed covering factual items concerning the students' personal, family, scholastic, social, and interest backgrounds; and the students' future plans. No opinion questions were included because opinions change too rapidly. Specific reference to mathematics or other school subjects was avoided in order to keep any

subconscious bias from coloring the answers.

Before the questionnaire was administered, ten men and women in the fields of guidance, mathematics, psychology, and social studies were consulted regarding: (1) the value of this thesis problem, (2) the validity of this instrument, and (3) the improvement of the content and form of this questionnaire. Several students and instructors in the fields of education, science, and engineering were also asked to take the questionnaire and recommend changes.

Taking all these suggestions and criticisms into consideration, the questionnaire was revised, and administered to a sample population of twenty, eleventh year, college course students of both sexes. On the basis of the sample results, the questionnaire was again revised.

The final inquiry was given to 275 college course seniors of both sexes from five different high schools in Massachusetts and New York. Each school was in a community falling into a different population classification.

The 261 questionnaires (122 females and 139 males) used for analysis were tabulated separately for the students who were taking a fourth year of mathematics (called Maths) and for those who were not (called Non-Maths). Subgroups of males and females were then formed for each main group. There were twenty-five Math-Females, eighty-six Math-Males, ninety-seven Non-Math-Females, and fifty-three Non-Math-Males; that is, 111 Maths and 150 Non-Maths in all.

A set of classifications of the answers to each question were made and tables and figures were presented to show the numbers and percentages of students in each classification. This data permitted the compilation of three other tables listing factors which distinguished (1) the Maths from the Non-Maths, (2) the Math-Females from the Non-Math-Females, and (3) the Math-Males from the Math-Females; and indicating the degree of distinction both by percentage differences and percentage ratios.

Conclusions

Inspection of the results led to two general conclusions.

Conclusion I: Certain background factors were seen to distinguish the Maths from the Non-Maths, and more important, the Math-Females were seen generally to possess the same distinguishing background factors as the Math-Males, only to a considerably greater extent.

In the main, these factors are possessed to a high degree by both Math subgroups; that is, neither subgroup is solely responsible for the fact that the Maths have a higher percentage membership possessing each of these factors than the Non-Maths. However, it is generally true that the Math-females have a considerably higher percentage membership possessing each of these same factors than the Math-Males. Either Math subgroup, alone, has higher percentages for these factors

than the Non-Math subgroups. In that there are very few empty classes in the Non-Math classifications, it is obvious that the Non-Math groups possess these same background factors to some extent, but are not distinguished by them.

Conclusion II: The Math group as a whole, do not elect mathematics with the intention of using it in their chosen vocation.

Besides the two general conclusions stated above, specific conclusions are indicated regarding the following: (1) background factors which have no apparent association with any of the groups, (2) background factors associated with the Math-Female subgroup only, and (3) the effects of the future plans of the Math subgroups.

Background Factors Which Have No Apparent Influence

Seven of the background factors investigated in this survey did not seem to distinguish either of the two main groups. Although, as will be indicated below, four of them did affect one of the subgroups somewhat. Therefore, these seven factors were considered as having no apparent influence on either group, or, as possibly influencing both groups equally. A list of these seven factors is given below.

1. ages of parents
2. mothers' occupations
3. ages of siblings
4. siblings' occupations

5. language background at school

6. amount of reading during vacations

7. manner of spending summer vacations

The important conclusion is that three of these showed no discrimination among any of the groups or subgroups, although the other four did distinguish the Math-Females. These three are:

1. ages of parents

2. ages of siblings

3. sisters' occupations

Background Factors Associated With the Math-Females Only

Factors were found which distinguished the Math-Females from the Non-Math-Females, other than those (Table XXVI, p.102) which distinguished the entire Math group from the entire Non-Math group. Some of them are descriptive, others are possible sources of influence towards the election of mathematics, and some fall into both of these categories. The following factors are considered as being particularly associated with girls electing mathematics:

1. mother works

2. mother works in a scientific field

3. mother educated beyond college

4. father majored in engineering at college

5. is the only child

6. any brothers are college students

7. has been exposed at home to the hobbies: reading cooking, arts, games, and traveling.

8. has studied two languages in the first two years of high school

9. has studied home economics in the first two years of high school.

10. reads 3--4 books per month during vacations

11. goes to 1--2 parties per month

12. spends vacations at home or at a summer camp

13. pursues hobbies: arts, reading, and photography

14. belongs to the debating society at school

15. helps in the office at school

Some of these factors may seem contradictory, such as "is the only child" and " any brothers are college students". However, it must be remembered that these factors are not all possessed by each female mathematics student. (In this illustration, 20.8 per cent more of the Math-Females than the Non-Math-Females are the only child. Also, 20.0 per cent of the Math-Females have working brothers, 16.0 per cent of whom are college students; while 32.0 per cent of the Non-Math-Females have working brothers, of whom, only 10.3 per cent are college students.) Both of these factors, then, are more to be associated with the Math-Females than the Non-Math-Females.

The Effects of the Future Plans of the Math Subgroups

The future plans of the students show little association with their election of mathematics. Approxiamtely 20 per cent of the Math-Females (10 per cent more than any other subgroup) are undecided as to their vocational aim, 16 per cent intend to go into education, and only 25 per cent into mathematical or scientific vocations. These facts lead to the conclusion that most girls electing mathematics do not do so with their vocational aim in mind.

Approximately 25 per cent of the Math-Males intend to take up mathematical or scientific vocations, less than 10 per cent are undecided, and 65 per cent have made up their minds to go into non-mathematical or non-scientific vocations. This leads to the conclusion that the boys, too, are influenced by some factor other than their vocational aim in electing mathematics.

Suggestions for Further Research

A study might be made of these background factors which were seen to be associated with female mathematics students, in an attempt to separate the effects (those factors which are the result of taking mathematics) from the possible causes of the election of mathematics. The interview and questionnaire techniques are both satisfactory approaches to this problem.

Any one of the factors listed in table XXVII as distinguishing Math-Females from Non-Math-Females, could bear further investigation to discover its degree of association with girls who elect mathematics.

A study using the interview technique might be made to investigate the reasons given by both Math and Non-Math students for electing or not electing mathematics.

An attempt might be made through the study of the class records and of the observations of classroom teachers, to determine in just which year of the elementary or high school, sex differences in ability in arithmetic or mathematics first appear.

A program of educating women to the idea that mathematics is an acceptable field of endeavor for a woman and worth her consideration, arranged as part of a vocational guidance program, could be carried out to be followed by an investigation of any changes in the election of mathematics as a result.

A study might be made of the amount of mathematics subsequently elected on the college level by those fourth year mathematics students who did not intend to go into a mathematical or scientific vocation as well as by those who did.

Further study might be made of the relation of the Math students' vocational plans to their mathematics interest.

APPENDIX

Please do not sign your name. There is NO interest in the student's answers as related to the individual student. The answers to these questions are to be used in a general study of high school seniors.

Fill in all blanks. Make your answers specific, but brief.

When you are given a choice of answers, indicate with a check mark (✓) which one or ones you choose.

FILL IN ALL BLANKS AS ACCURATELY AS YOU CAN. WHEN YOU ARE GIVEN A CHOICE OF ANSWERS, MARK WITH A CHECK (✓) THE ONE YOU CHOOSE.

A. 1. Age to nearest birthday:_____years.

2. Sex: Female____, Male ____.

3. Religion: Protestant____, Jew____, Catholic____, Other____.

B. 1. Marital status of parents: Married____, Separated or divorced____, Either one dead____.

IF YOU HAVE PARENTS AND STEP PARENTS THE FOLLOWING QUESTIONS REFER TO THE ONES YOU ARE LIVING WITH.

2. If father and/or mother are living give: Father's age_____, Mother's age_____

3. a) Father's occupation is (or was)_____
(Be specific. For example; say, "refrigerator salesman" not "salesman".)

b) Is he owner (or part owner) of the business in which he works? Yes__No____.

4. Mother's occupation is _____
(If housewife, say so.)

5. a)Father's education: Elementary school____, High School____, College ____,

Other (indicate what) _____.

b)If college, what was father's major subject? _____.

6. a)Mother's education: Elementary school____, High School____, College ____,

Other (Indicate what) _____

b) If college, what was mother's major subject? _____.

7. a) How many living brothers do you have? (Include half or step-brothers)_____.

b) What are their ages? _____

c) If any work, what are their occupations? (Be specific) _____

_____

_____

8. a) How many living sisters do you have? (Include half or step-sisters)_____.

b) What are their ages? _____

c) If any work, what are their occupations? (Be specific) _____

_____

9. List the hobbies of your mother, father, brothers, or sisters. Do not list your own hobbies. One person may have more than one hobby.

Mother's hobbies	Father's hobbies	Brothers' hobbies	Sisters' hobbies

10. Name any foreign languages spoken in your home more often than English.

_____

11. Write the number of the following types of rooms there are in your home:

Kitchen____, Living room ____, Dining room___, Bathrooms___, Bedrooms ____,

Others____. (If one room is used for more than one purpose, count it only once.)

C. 1. In the following tables, check the subjects you took in your tenth and eleventh years of school, and indicate the final marks received in each subject. For

For example:

English	✓	B	
Mathematics			
History	✓	C	

YEAR 10 Subject		Final Mark
English		
Math.		
History		
Language (indicate which)		
Language (indicate which)		
Science (indicate which)		
Music		
Art		
Others (name them)		

YEAR 11 Subject		Final Mark
English		
Math.		
History		
Language (indicate which)		
Language (indicate which)		
Science (indicate which)		
Music		
Art		
Others (name them)		

2. List the subjects you are now taking: _____

_____

_____

D. 1. Indicate your plans for the future, by checking the following:

College ___ If so what course? Liberal Arts ____, Medical or Dental____, Science or Engineering ____

Business ____, Teaching ____, Junior College _____. Undecided _____

Business School_____.
Technical or Vocational School _____.

Working _____. Nature of the work_____

Armed Services _____.
Other (indicate what) _____

2. What is your vocational aim?_____

E. 1. List all teams, clubs, and other organized groups to which you belong:
a) connected with your school:_____

_____

b) connected with your church: _____

_____

c) others:_____

_____

2. List by type, putting your most recent position first, your working experience:

Nature of the work _____ How long you worked there

_____

_____

_____

_____

_____

F. In any of the following questions where you are given a choice of answers, you may check more than one answer.

1. a) Approximately how many books do you now read?(Do not count those required for school work)(1)_____per month, (2) _____per month during school
during vacations

b) Do you prefer: Fiction____, Non-fiction____, No preference _____.

2. How often do you go to dances or parties?_____times per month.
3. List all the hobbies you have ever taken up.

_____

_____

_____

_____

4. What two school subjects do you spend the most time on?

(1) _____ (2) _____

5. How do you generally spend your summer vacations? Working____,

Traveling____, Summer camp____, At home____, Other (indicate how)_____

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